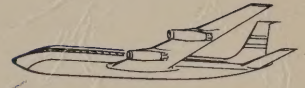


AEROCOM



AEROCOM 2210

HF AM/SSB RECEIVER

I N S T R U C T I O N

M A N U A L





AEROCOM STANDARD WARRANTY

Each piece of equipment, accessory and spare part sold by AEROCOM is guaranteed to be free from defects in design, material and workmanship. AEROCOM'S liability is limited solely to repairing or replacing defective items F.O.B. AEROCOM'S Plant, Miami, Florida (or other point within the Continental U.S.A. designated by AEROCOM) provided:

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AERONAUTICAL COMMUNICATIONS EQUIPMENT, INC.,
(AEROCOM)
3090 S. W. 37th Avenue
MIAMI, FLORIDA 33133
U. S. A.

AEROCOM 2210

HF AM/SSB RECEIVER



AEROCOM

3090 SOUTHWEST 37th AVENUE • MIAMI • FLORIDA 33133

SUMMARY SHEET

MODEL NUMBER: 2210

TYPE OF EQUIPMENT: HF AM/SSB RECEIVER.

SPECIFICATIONS

TYPES OF RECEPTION..... (a) SSB (A3A or A3J as specified on order).
(b) AM (A3) and AME (A3H).

FREQUENCY RANGE..... 2 to 24 MHz.

SENSITIVITY..... (a) SSB $1\mu\text{V}$ for $10\text{dB } \frac{S+N}{N}$ ratio.
(b) AM/AME $1\mu\text{V}$ for $6\text{dB } \frac{S+N}{N}$ ratio.

SELECTIVITY..... (a) SSB..... 300-2700 Hz within 6dB, carrier -30dB,
and 50dB at -450 Hz and +3400 Hz.
(b) AM/AME... 6/60dB = 6kHz/14kHz.

FRONT PANEL CONTROLS

AND INDICATORS..... (a) Power ON/OFF switch and indicator lamp.
(b) RF GAIN Control.
(c) Clarifier Control.
(d) Squelch ON/OFF switch and indicator lamp.
(e) Mode selector switch.
(f) Audio Output jack for 4-16 ohms output.
(g) Audio Level Control for 4-16 ohms output.

INPUT IMPEDANCE..... 50 ohms, unbalanced.

SPURIOUS REJECTION..... 60dB minimum.

FREQUENCY STABILITY..... ± 10 Hz maximum.

INTERMODULATION..... 40dB minimum below full PEP output, two-tone test.
100 μV input.

AGC..... With change in input signal from $1\mu\text{V}$ to 100,000 μV
(100dB), output is constant within 6dB.

AUDIO OUTPUT..... (a) 0.5 W low impedance, 4-16 ohms.
(b) 10 mW, 600 ohm nominal, balanced.

REMOTEABLE FUNCTIONS..... (a) Mode select
(b) RF gain
(c) Clarifier
(d) Squelch ON/OFF

HUM AND NOISE..... 40dB minimum below rated output.

IM-221-0

ENVIRONMENTAL..... Temperature: -10°C to +55°C.
Humidity: To 95%.
Altitude: To 15,000 feet.

POWER INPUT..... 115/230 VAC, 50/60 Hz, 35 VA.

PHYSICAL..... 3-1/2 x 19 inch standard rack panel construction, approximately 12 inches deep.
(89 mm x 483 mm x 305 mm deep)

CONNECTORS..... (a) RF.....Type N female coaxial fitting.
(b) Controls...Amphenol #126-811.

NET WEIGHT..... 12 pounds or 5.5 kilograms.

AEROCOM 2210 HF AM/SSB RECEIVER

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MODEL 2210 RECEIVER

INSTRUCTIONS

1. GENERAL DESCRIPTION

1.1 Electrical:

The AEROCOM 2210 HF Radio Receiver is all solid state. The modularized single channel crystal controlled fixed frequency receiver is designed for reception of conventional AM or SSB signals in the Aeronautical services. Manual mode selection at the receiver or from remote control locations allows the Receiver to function in either AM (for AM or AME signals) or SSB (for single sideband signals). The 2210 is designed for long term reliability and ease of maintenance.

A double balanced Schottky diode mixer at the RF input provides excellent intermodulation characteristics. The incoming RF signal is converted to 64 MHz, the first IF frequency. A bandpass crystal filter at this frequency removes all spurious products. After the filter, the signal is converted to 1750 kHz, the second IF frequency. This provides good RF selectivity without the use of RF pre-selector components. All IF amplifiers use dual gate MOSFETs (Metal Oxide Semiconductor Field Effect Transistors) for superior linearity over a wide range of input signal levels with rejection of spurious response.

Crystal lattice filters in the second IF sections (AM/AME and SSB) provide the basic receiver selectivity. These filters are of 8 pole design.

For detection, a phase-locked loop is used for both AM and SSB. For AM/AME, the PLL synchronizes with the carrier to provide a high level injection signal with synchronous detection. This provides low distortion and improves sensitivity as compared to a conventional diode AM detector. It also provides an excellent automatic phase-locked squelch which is responsive only to a carrier.

For SSB detection, the PLL IC works with a highly stable crystal controlled injection oscillator in a proportional oven, to provide product detection. In the SSB mode, squelch is derived from the AGC circuit. Extremely fast attack time and slow decay time allow smooth AGC operation through voice syllables.

1.2 Physical:

1.2.1 General:

The Receiver mounts in a standard 19" (483 mm) relay rack cabinet. Vertical space required for the Receiver is 3-1/2" (89 mm). Maximum depth behind rack mounting surface is 12" (305 mm). Net weight of Receiver is 12 pounds (5.5 kg).

1.2.2 Top Cover:

TO DETACH THE COVER: Locate the 2 Dzus fasteners on the flanges of the cover (one on each flange, toward REAR). Give fasteners $1/4$ turn (90°) counterclockwise to partly release the lid. While holding the rear of lid slightly up, slide the cover back until it is clear of the front alignment pins. Now lift the cover off. Removing the top cover gives full access to all internal adjustments and the major working portion of the Receiver.

TO REPLACE THE COVER: Reverse the process by sliding the lid forward onto the alignment pins. Tighten Dzus fasteners.

1.2.3 Printed-Circuit Board Modules:

The basic Receiver consists of 4 printed-circuit boards. Two of these boards are stacked (one on top of the other) on the RIGHT side of chassis toward the front, where the words AUDIO MODULE - 1750 kHz MODULE appear. On the opposite (LEFT) side of the chassis (where the words VHF OSC MODULE appear) another pair of PC boards is stacked in the same manner. The boards are secured by means of the input/output interconnecting pins. To remove the boards, merely lift them up off the pins.

1.2.4 Crystal Correlation:

The 1750 kHz Oscillator and HF Oscillator are both parallel resonant crystal oscillator circuits and can therefore be pulled in frequency by varying the amount of capacitance across the crystal. A trimmer capacitor is incorporated in the circuit. The trimmer capacitor is used to pull the crystal to the exact required frequency. To gain access to either trimmer correlation capacitor, remove the metal plate that covers the area where the adjustment is to be made. To remove plate, turn Dzus fasteners 90° counterclockwise and remove the cover. A small hole located in the top of the crystal oscillator oven allows a small flat blade screwdriver to be inserted into the oven to adjust the capacitor. After the capacitor is adjusted, replace the cover over the oven cavity.

1.2.5 Chassis removal:

The main chassis can be easily removed from the frame of the Receiver. There are two Dzus fasteners located near the front edges of the Receiver chassis. Rotate these fasteners 90° counterclockwise. Lift the chassis slightly up and towards the rear of the Receiver frame. Disconnect the plug located on the right front side of the Receiver. The chassis can now be completely removed. When re-mounting the chassis on Receiver frame, make certain that the interconnecting cable/plug assembly between the front panel and the main chassis is securely seated.

2. INTEGRATION INTO SYSTEM

The 2210 Receiver is a separate and complete ground station receiver (excluding the antenna and loudspeaker). Ordinarily, it requires no integration into a more comprehensive system. The Receiver may, on occasion, be associated with other equipments in a system that requires the Receiver to be

remotely operated. Refer to Section 4.1.5, Remote Connections, for complete details explaining the remote features of the 2210 Receiver and implementation.

3. THEORY OF OPERATION

3.1 Overall Theory:

Refer to Block Diagram Dwg. C-8100, for the following discussion:

The block diagram shows the simplicity and straightforwardness of the Receiver even though the Receiver uses up and down conversion and is capable of both AM or SSB reception. The major portion of the Receiver consists of plug-in modules, as shown on the block diagram. The AR-xxxx numbers shown in various blocks are AEROCOM part numbers for these modules.

The RF signal from antenna is fed into the Receiver after passing first through Low-pass Filter module AR-6434. The Filter has a cutoff frequency of 24 MHz and does not effect the received signal but does block the VHF local oscillator signal from being fed into the transmission line and antenna.

From the Low-pass Filter, signals are coupled into the 64 MHz IF amplifier module. The signal is first fed into mixer Z101. Here the signal mixes with the VHF local oscillator signal, which is supplied from the VHF Oscillator module. The output of mixer is the desired signal mixed up to 64 MHz, the First IF Amplifier frequency. The signal is amplified by Q101 and then passes through the crystal filter, FL1, to remove any spurious products that have been generated. Transistors Q102 and Q103 amplify the 64 MHz signal following the crystal filter. The signal is then coupled into transistor Q104 where it mixes with the 62.25 MHz signal. The resulting output is the desired signal translated down to 1750 kHz.

The 62.25 MHz signal is also generated in the 64 MHz IF Amplifier module. The HF Oscillator signal is fed into the board and into transistor mixer Q105. Here, the HF Oscillator mixes with VHF local oscillator signal to produce 62.25 MHz. The difference between the VHF local oscillator and the HF local oscillator is always 62.25 MHz. The output of Q105 is filtered and further amplified by integrated circuit IC102. The output of IC102 is coupled into mixer Q104.

The output of the 64 MHz IF Amplifier module is therefore the desired received signal translated to 1750 kHz. The signal leaves the 64 MHz IF Amplifier and is coupled into the two crystal filters (one for SSB reception and one for AM reception). The output of each crystal filter is connected to the 1750 kHz IF Amplifier module input.

The input stage of 1750 kHz IF is IC301. A switch controlled by the mode select line selects either the SSB signal or AM signal. The output of the switch is connected to a 3-stage IF amplifier comprised of transistors Q301, Q302 and Q303. The output of this amplifier chain is connected to

detector integrated circuit IC302. In the AM mode, the IC is used as a synchronous detector. In the SSB mode, IC302 is used as a product detector. The 1750 kHz crystal controlled local oscillator injection signal is fed into the IC302 along with the received SSB signal.

Also included in the 1750 kHz IF is the AGC detector/amplifier circuit. A sample of the IF signal is coupled into the AGC detector circuit. Following detection of the signal level, a time-constant circuit controls rise and fall times of AGC signal. Decay time is different for AM and SSB and is controlled from the mode select line. The AGC signal is then amplified by IC304 and fed to the 3-stage IF amplifier in this module. The AGC signal is also fed back to the 64 MHz IF amplifier module and controls the level of amplification at 64 MHz.

The detected audio in the 1750 kHz IF is connected to the input of the Audio module. The audio signal connects to IC404. This dual electronic attenuator controls the audio level. Both attenuators work so that the 600 Ω low level audio line can be controlled independently of the high level audio line. These two signals are then fed into IC405 (a dual audio power amplifier). The IC405A amplifies the audio signal up to a maximum level of +10 dBm on the secondary of audio transformer T401. The IC405B amplifies up to a maximum level of 0.5W for speaker operation.

Squelch detection circuitry is included on the Audio Module. The IC401A detects the presence of an AM signal, and IC401B detects the SSB signal. Outputs are connected to IC402B and IC402C. This arrangement is used as an OR gate to select either AM or SSB signals as determined by the mode select line. The IC401C is the mode select buffer amplifier that controls IC402B and IC402C. The IC402A is a driver amplifier that buffers the mode select line used in the remainder of the receiver.

Integrated circuit IC402D has two functions. First, it drives the IC403A, IC403B and IC403C which operate the squelch relay, the squelch operated indicator lamp and the dual electronic audio attenuators. Its second function is to disable the circuitry by the squelch ON/OFF switch so that the Receiver is active at all times rather than only when a signal is present.

3.2 64 MHz IF Amplifier:

Refer to the schematic of this module (drawing C-8031) and the schematic of the Receiver (drawing C-8084) to understand the various interconnections between the 64 MHz IF module and the remainder of the Receiver.

The desired HF signal is applied to the input of balanced mixer Z101. Here, the signal mixes with the VHF local oscillator signal and converts the desired signal to 64 MHz. From the mixer, the 64 MHz output signal is capacitively coupled to transformer T101. T101 and capacitor C103 are parallel resonant at 64 MHz. The incoming 64 MHz signal is tapped down on T101 to provide the proper load to output of mixer. The output of the tuned circuit is connected to gate 1 of transistor Q101. The DC bias for this gate is supplied from resistive divider R101/R102. The cold side of the tuned circuit is bypassed to ground by capacitor C104.

The 15V B+ for the module is derived from a zener diode regulator connected through a 56 ohm resistor to the +18 main +B supply.

Transistor Q101 amplifies the 64 MHz IF from the mixer to a sufficient level to drive 64 MHz filter. The output of Q101 is capacitively coupled to the input of FL101. Inductor L102 and capacitor C144 serve to tune the output of Q101 and cancel the reactance of input of FL101. Source resistor R105 provides self-bias for Q101, and C106 is the bypass for R105.

The AGC bias voltage is applied to gate 2 of Q101 to control the gain of this stage.

Bandpass filter FL101 removes spurious products from the IF signal. The output is capacitively coupled to gate 1 of transistor Q102. L103 and C145 are tuned to 64 MHz and cancel the reactance at the output of FL101.

Q102 is a common source amplifier. DC bias for gate 1 is established by the voltage divider R106/R107. AGC bias is supplied to gate 2 via decoupling filter R108/C112. R109 is the source bias resistor, with C118 as the source bypass. Drain voltage is supplied to Q102 via decoupling filter L104/C114. The output of Q102 is transformer coupled to gate 1 of Q103. C111 tunes the primary of T102. The secondary is tuned by C115. R114 serves to lower the "Q" of this tuned circuit.

Q103 is the final 64 MHz amplifier stage. Voltage divider R110/R111 supplies DC bias to gate 1. C116 is the bypass capacitor for the "cold" end of T102. AGC bias is supplied to gate 2 of this stage through decoupling filter R112/C119. Drain voltage is supplied via decoupling filter L105/C121. R113 is a source bias resistor and C122 is the source bypass. The output of Q103 is transformer coupled to gate 1 of Q104. C120 tunes the primary of T103. R138 lowers the "Q" of this tuned circuit. The "cold" end of T103 is bypassed by C125.

Q104 is the second mixer in the 64 MHz IF amplifier. The 64 MHz IF frequency is transformer coupled to gate 1. The 62.25 MHz local oscillator frequency is capacitively coupled to gate 2. The 1750 kHz difference frequency is taken from the drain. R116 and R115 form a resistive voltage divider that supplies a DC bias to gate 1 of Q104. R118/R120 is a resistive voltage divider that supplies DC bias to gate 2. Drain voltage is supplied through decoupling filter L106/C130. R121 is a source bias resistor and C132 is the source bypass capacitor. R119 isolates bias from the 62.25 MHz local oscillator signal. R117/C126 decouple the bias network. C127 is a bypass capacitor at the "cold" end of R119. L115 and C142 are tuned to 1750 kHz. The 1750 kHz second IF frequency is capacitively coupled to the crystal filters located on the main chassis.

The Q105 mixer provides 62.25 MHz from the VHF oscillator and HF oscillator. The VHF oscillator is capacitively coupled to gate 1. The HF oscillator is coupled through a lowpass filter and capacitor to gate 2.

The 62.25 MHz difference frequency is taken from the drain. R131/R130 is a resistive divider for gate 1 bias. Resistors R132/R134 form a divider for gate 2 bias. R135 is the source bias resistor and C140 is the source bypass capacitor. C138/C124/L110 make up a parallel

resonant circuit tuned to 62.25 MHz. L109/C137 provide decoupling for the drain supply voltage. L108/L107/C134/C135/C136 comprise the low-pass filter between HF oscillator and gate 2. R133 is the resistive termination for the lowpass filter.

IC102 is an amplifier for the 62.25 MHz signal. R136/R137 form a resistive voltage divider that supplies DC bias to pins 1 and 5 of the IC. C102 is an RF bypass capacitor. The 62.25 MHz signal is connected to pin 1. Regulated 18 volts connects to pin 8. L113/C123 provide power supply decoupling. R122 reduces bias voltage to pin 7. C141 is a DC blocking capacitor. L111 and C107 match output of Q105 to input of IC102. L112 allows the same DC bias on pins 1 and 5 while isolating the 62.25 MHz from pin 5. L114, C113 and C139 tune the output of IC102 to 62.25 MHz.

IC101 is an integrated circuit operational amplifier that controls the AGC signal to the 64 MHz amplifier stages. R124/R125 form a resistive divider that determines gain of amplifier. R129/R128 is a resistive divider carrying a DC level to the inputs to control the AGC output. R128 is the adjustable part of this divider. C143 is a bypass capacitor. AGC voltage from the 1750 kHz module is supplied to the non-inverting input via R127. R123 sets the range of RF gain control.

3.3 1750 kHz Amplifier:

Refer to the schematic of this module (drawing C-8032) and schematic of the Receiver (drawing C-8084) to understand the various interconnections between the 1750 kHz IF module and the remainder of the Receiver.

IC301 is a solid state switch. The 1750 kHz signal from the AM filter is capacitively coupled to pins 4 and 16 of the IC. The SSB signal is capacitively coupled to pins 5 and 9. The switch control bias is applied to pins 10 and 15. R303/R346 is a resistive divider for DC bias to the AM input of the switch. R302/R348 is a resistive divider supplying DC bias to SSB input of IC. R301/R347 is a resistive divider supplying the DC bias that controls the switching of IC301. R350/R349 is a resistive divider to supply DC bias to pin 13 of the IC. C306 is connected to the grounding contact that goes to the AM filter. C307 is connected to the grounding contact that goes to the SSB filter.

Q301 is a common source, 1750 kHz amplifier stage. The output from switch IC301 is capacitively coupled to gate 1 of Q301. R305/R304 is a resistive divider that supplies gate 1 with DC bias. R307 is the source bias resistor and C312 is the bypass for this resistor. AGC bias is supplied to gate 2 through R306. C311 is the bypass capacitor for gate 2. L302 and C313 form a parallel resonant circuit tuned to 1750 kHz. R308 lowers the "Q" of this tank circuit. Output is taken from the drain and capacitively coupled to gate 1 of Q302.

Q302 is connected the same as Q301. R310 and R309 determine DC bias for gate 1. R313 is the source resistor and C317, the source bypass capacitor. C316 is gate 2 bypass. L304 and C318 are parallel resonant at 1750 kHz.

R314 lowers the "Q" of this tank circuit. The AGC is applied to gate 2. Output is taken from the drain and is capacitively coupled to gate 1 of Q303.

Q303 is the 1750 kHz output stage. Except for C323 and C324, it is connected the same as Q302. Capacitive divider C323/C324 reduces signal level of the 1750 kHz IF to the level necessary to drive IC302.

IC302 is a phase-locked loop IC that demodulates AM or SSB signals. In the AM mode, IC302 achieves true synchronous detection and in SSB, the circuit is a product detector. Diode switching controls IC302 for AM or SSB detection.

Sideband information is connected to pin 4. The AM carrier connects to pin 12 through a 90° phase shift network consisting of R321, R322, C325 and C326. A 1750 kHz BFO signal is injected into pin 13. C329 determines the capture range of the internal voltage controlled oscillator of IC302. C333 determines frequency of VCO. R328 and R327 provide a means of fine adjustment of the VCO. The detected AF is taken from pin 1.

D301 switches pin 12 to the RF ground for SSB operation. D302 connects pin 13 to ground for AM operation. R323 and R326 connect DC bias voltage to the cathodes of the switch diodes. R319 and R320, R324 and R325 are resistive dividers that apply a +DC bias to anodes of switch diodes. L309, L308, L310 and L311 isolate RF signals on pins 12 and 13 from ground.

IC303A and IC303B are IC comparator circuits. They are connected so that when IC303A is "on", IC303B will be "off". They are switched by DC level on mode select line. When IC303A is "on", D301 is forward biased, placing IC302 in SSB mode. When IC303B is "on", D302 is forward biased, placing IC302 in AM mode.

R329/R330 is a resistive voltage divider that supplies a DC reference bias to the comparators. C335 and C336 are bypass capacitors.

Power supply and stage decoupling is provided by R354, L303, L305, L307, C305, C310, C315, C320 and C332.

The full 1750 kHz signal is used to develop the AGC signal. D303, D304, D305 and D306 along with C339 comprise a voltage quadrupler that produces the DC AGC signal from the 1750 kHz IF. C338 and C337 provide a high impedance connection between the 1750 kHz IF output and the quadrupler. D306, a silicon diode, provides isolation between the high impedance AGC timing circuit and the germanium diodes in the multiplier. R335 determines the decay time for SSB operation. The value was chosen to avoid loss of syllables during SSB reception.

Q304 and associated components determine attack and decay times for the AGC in AM mode. Q304 is a switch that connects C303 across AGC voltage with Receiver in AM mode. R335 and C303 determine decay time of the AGC for AM operation. R335 and circuit capacitance determine decay time for AGC in the SSB mode.

The 15 V B+ for the module is derived from a zener diode regulator connected through a 56 ohm resistor to the +18 main +B supply.

Q305 is a source follower. It isolates the high impedance timing circuit from AGC circuits further along.

IC304 is an IC operational amplifier. It raises the AGC level delivered to the 1750 kHz IF amplifiers and to the 64 MHz IF AGC system. R342 and R340 establish the limit of gain of IC304. R338/R339 is a resistive divider that supplies bias to the inverting input of IC304. C341 supplies the same AC signal to the inverting input that appears at the non-inverting input. This reduces ripple at the output of the AGC amplifier.

3.4 Audio Module:

Refer to schematic of this module (drawing C-8033) and schematic of the Receiver (drawing C-8084) to understand various interconnections between the audio module and remainder of the Receiver.

The audio module contains two amplifiers and the logic circuitry required for squelch and mode selection. The following describes the operation of each section:

IC comparators are used in the squelch and mode control circuits.

The value of voltage at the output of a comparator depends on the values of voltages at the two inputs. If the absolute value of voltage at the inverting (minus) input terminal is greater than the absolute value at the non-inverting (plus) terminal, output will be in the "low" state.

If the absolute value of the voltage at the non-inverting input is greater than the absolute value at the inverting terminal, the output will be in the "high" state. The output stages of comparators used are in the open collector configuration. This makes possible the "wired OR" circuit that is used.

Squelch operation in the AM mode depends on the presence of a carrier. When a carrier is present, a DC level shift occurs at the input of IC401A. This change at the input causes the output to switch "low". The DC level at the output of IC401A connects to the input of IC402B, causing it to switch "low".

The output of IC402B is connected to IC402D, which switches "high". The high output state of IC402D switches on the transistors contained in IC403. These transistors operate the squelch relay and squelch lamp, and turn on the audio amplifiers.

Squelch operation in the SSB mode depends on the AGC operation. The DC signal from the AGC bus is taken from the 1750 kHz board and applied to the input of comparator IC401B. When IC401B switches, IC402C also switches. The DC at the output of IC402C is connected to IC402D. IC402D operates the same as in the AM mode.

R314 lowers the "Q" of this tank circuit. The AGC is applied to gate 2. Output is taken from the drain and is capacitively coupled to gate 1 of Q303.

Q303 is the 1750 kHz output stage. Except for C323 and C324, it is connected the same as Q302. Capacitive divider C323/C324 reduces signal level of the 1750 kHz IF to the level necessary to drive IC302.

IC302 is a phase-locked loop IC that demodulates AM or SSB signals. In the AM mode, IC302 achieves true synchronous detection and in SSB, the circuit is a product detector. Diode switching controls IC302 for AM or SSB detection.

Sideband information is connected to pin 4. The AM carrier connects to pin 12 through a 90° phase shift network consisting of R321, R322, C325 and C326. A 1750 kHz BFO signal is injected into pin 13. C329 determines the capture range of the internal voltage controlled oscillator of IC302. C333 determines frequency of VCO. R328 and R327 provide a means of fine adjustment of the VCO. The detected AF is taken from pin 1.

D301 switches pin 12 to the RF ground for SSB operation. D302 connects pin 13 to ground for AM operation. R323 and R326 connect DC bias voltage to the cathodes of the switch diodes. R319 and R320, R324 and R325 are resistive dividers that apply a +DC bias to anodes of switch diodes. L309, L308, L310 and L311 isolate RF signals on pins 12 and 13 from ground.

IC303A and IC303B are IC comparator circuits. They are connected so that when IC303A is "on", IC303B will be "off". They are switched by DC level on mode select line. When IC303A is "on", D301 is forward biased, placing IC302 in SSB mode. When IC303B is "on", D302 is forward biased, placing IC302 in AM mode.

R329/R330 is a resistive voltage divider that supplies a DC reference bias to the comparators. C335 and C336 are bypass capacitors.

Power supply and stage decoupling is provided by L301, L303, L305, L307, C305, C310, C315, C320 and C332.

The full 1750 kHz signal is used to develop the AGC signal. D303, D304, D305 and D306 along with C339 comprise a voltage quadrupler that produces the DC AGC signal from the 1750 kHz IF. C338 and C337 provide a high impedance connection between the 1750 kHz IF output and the quadrupler. D306, a silicon diode, provides isolation between the high impedance AGC timing circuit and the germanium diodes in the multiplier. R335 determines the decay time for SSB operation. The value was chosen to avoid loss of syllables during SSB reception.

Q304 and associated components determine attack and decay times for the AGC in AM mode. Q304 is a switch that connects C303 across AGC voltage with Receiver in AM mode. R335 and C303 determine decay time of the AGC for AM operation. R335 and circuit capacitance determine decay time for AGC in the SSB mode.

Q305 is a source follower. It isolates the high impedance timing circuit from AGC circuits further along.

IC304 is an IC operational amplifier. It raises the AGC level delivered to the 1750 kHz IF amplifiers and to the 64 MHz IF AGC system. R342 and R340 establish the limit of gain of IC304. R338/R339 is a resistive divider that supplies bias to the inverting input of IC304. C341 supplies the same AC signal to the inverting input that appears at the non-inverting input. This reduces ripple at the output of the AGC amplifier.

3.4 Audio Module:

Refer to schematic of this module (drawing C-8033) and schematic of the Receiver (drawing C-8084) to understand various interconnections between the audio module and remainder of the Receiver.

The audio module contains two amplifiers and the logic circuitry required for squelch and mode selection. The following describes the operation of each section:

IC comparators are used in the squelch and mode control circuits.

The value of voltage at the output of a comparator depends on the values of voltages at the two inputs. If the absolute value of voltage at the inverting (minus) input terminal is greater than the absolute value at the non-inverting (plus) terminal, output will be in the "low" state.

If the absolute value of the voltage at the non-inverting input is greater than the absolute value at the inverting terminal, the output will be in the "high" state. The output stages of comparators used are in the open collector configuration. This makes possible the "wired OR" circuit that is used.

Squelch operation in the AM mode depends on the presence of a carrier. When a carrier is present, a DC level shift occurs at the input of IC401A. This change at the input causes the output to switch "low". The DC level at the output of IC401A connects to the input of IC402B, causing it to switch "low".

The output of IC402B is connected to IC402D, which switches "high". The high output state of IC402D switches on the transistors contained in IC403. These transistors operate the squelch relay and squelch lamp, and turn on the audio amplifiers.

Squelch operation in the SSB mode depends on the AGC operation. The DC signal from the AGC bus is taken from the 1750 kHz board and applied to the input of comparator IC401B. When IC401B switches, IC402C also switches. The DC at the output of IC402C is connected to IC402D. IC402D operates the same as in the AM mode.

Comparators in the AM and SSB squelch circuits are connected in a logical "OR" configuration. This is accomplished by connecting the output of mode select comparator IC401C to the inverting input of IC402B and non-inverting input of IC402C. The state of IC401C determines whether the AM circuit or the SSB will be operational.

The mode select signal supplied by IC402A is for switching the AGC time constant, the filters and the PLL detector. The output of IC401C controls IC402A. IC401D turns off the 1750 kHz oscillator in the AM mode and switches on the 1750 kHz oscillator in the SSB mode.

Resistive voltage dividers set the point of operation of the squelch in AM or SSB. R403, R404 and R405 determine the AM operating point. R408, R409 and R410 determine the SSB operating point. R404 is the adjustment for AM. R409 is the adjustment for SSB.

A switch is used to disable the squelch circuit. When the switch is off, IC402D is held in the "high" state causing the relay, the lamp, and the audio to remain on.

The audio signal from the 1750 kHz IF module is connected to the input of the audio amplifier/attenuator IC404A and IC404B. The gain of IC404A and IC404B depends upon the DC voltage on the control input terminal. The outputs of this IC are connected to IC405A and IC405B respectively. IC405A and IC405B are operational amplifiers designed to be used as audio power amplifiers. The output of IC405A is capacitively coupled to transformer T401. The output of this circuit will give at least 10 mW of audio into a 600 Ω line. IC405B will provide 0.5W into a low impedance load such as a speaker.

3.5 VHF Oscillator Module (AR-1049):

The VHF Oscillator Module is comprised of a crystal oscillator operating at local oscillator frequency, a buffer amplifier and a power amplifier. This module provides enough power to drive the input mixer. Refer to the schematic of this module (drawing C-8030) and schematic of the Receiver (drawing C-8084) to understand the various interconnections between this module and the remainder of the Receiver.

Transistor Q201 is connected in a standard series resonant overtone crystal oscillator circuit. The LC network L202/C204 forms the load for the oscillator. This LC network is tuned to the VHF local oscillator frequency which is the crystal frequency operating in its 5th overtone mode. Capacitors C201 and C202 control amount of feedback and therefore, level of oscillation. Resistors R201, R202 and R203 establish the DC bias operating point of transistor Q201.

The signal from the oscillator is coupled through T-pad R204/R205/R206, into the base of transistor Q202 (a common emitter amplifier). The LC network L204/C210 is the tuned load for this amplifier stage. Resistors R207, R208 and R209 provide DC bias for transistor Q202. The emitter resistor is bypassed by capacitor C208.

The signal from Q202 is now coupled to the next stage through T-pad resistors R210/R211/R212. Tank circuit L206/C217 (for transistor stage Q203) is tuned to the VHF LO frequency. Q203 is DC biased similar to the previous stages and its emitter is AC grounded by capacitors C215/C216.

The output tank circuit L206/C217/C218/C220 is resonant at VHF LO frequency and matches the output impedance of Q203 to 50 ohms. The high level output supplies approximately 0.5 W to the input mixer on the 64 MHz IF module.

Capacitor C219 allows a small amount of energy to be passed and this low level output goes to the rear of the Receiver to allow frequency measurements of the signal supplied by this module.

3.6 HF/1750 kHz Oscillator:

Refer to HF oscillator schematic B-8034 and main chassis schematic C-8084-1 for operation of these oscillators and connection to the Receiver.

Nearly identical oscillators are used for the 1750 kHz oscillator and the HF oscillator. For 1750 kHz operation, varactor diode D2 and associated components R11 and C9 are added to the basic oscillator. These additions allow clarifier control of the oscillator from the front panel.

Q1 is the oscillator transistor. C1 is a trimmer capacitor that sets the oscillator to the exact frequency. Y1 is the quartz crystal. R1 provides the DC bias on gate 1 of Q1. R4/R5 is a resistive voltage divider for gate 2 bias. C4 and C5 are bypass capacitors. C2/C3 is a capacitive divider for feedback voltage to sustain oscillation.

R3 is the source resistor. Output from the oscillator is taken from the source and capacitively coupled to Q2 through C6.

Q2 is a buffer amplifier. Resistive divider R7/R8 provides base bias. R9 is the emitter resistor. Output is direct, coupled to emitter follower output transistor Q3.

Output to receiver circuits is provided by Q3. R10 is the emitter resistor.

D1 is a zener diode that regulates B+ supply for the oscillator. R6 limits current to D1.

3.7 Power Supply:

Refer to drawing C-8084-1. The power supply is mounted on the main chassis. Slide switch S4 connects the input for either 220 or 115 VAC operation. Transformer T1 supplies AC current for the rectifier, and 12 VAC for crystal ovens. B+ is derived from full wave rectifier D3/D4. C1 provides B+ filtering.

IC1 is a series type voltage regulator. The B+ is connected to the input of IC1. IC1 provides the regulated 18 volts for receiver circuits. C2 provides filtering on the output of the 18 volts regulator.

4. INSTALLATION

4.1 Installation Procedure

4.1.1 Visual Inspection:

Give the Receiver a thorough visual inspection to determine if damage has been incurred during shipment. Make sure all devices and cable connectors are properly seated in their respective sockets.

4.1.2 Mounting:

The 2210 Receiver is designed to be installed in a standard relay rack or cabinet occupying 3-1/2 inches (89 mm) of panel space. If a closed cabinet is used, there should be sufficient ventilation to allow air movement around the set.

4.2.3 Antenna Connection:

The type "N" coaxial connector provided on the Receiver is designed to insure minimum loss and VSWR when used with 50 ohm cable, such as RG-8/U. The transmission line from the antenna is connected to the receptacle marked "ANT" using a UG-21B/U or similar connector.

4.1.4 Power Connection:

This unit can be operated from 115/230 VAC, 47/63 Hz. Determine whether power source is 115 V or 230 V. Remove the top cover of Receiver and observe the 115/230 V slide switch mounted on the power transformer. This switch should be flicked to show the voltage being used. Insert the power cable supplied with the Receiver into the AC receptacle in the rear of the Receiver.

4.1.5 Remote Connections:

Refer to drawing A-8087 for typical remote control connections. This diagram shows a basic circuit for each remote connection, but normally only those circuits desired would be brought out.

4.1.5.1 Local Loudspeaker:

The 3 to 16 ohm voice coil of a local loudspeaker may be plugged into the front panel "Audio Output" jack or connected to terminals 13 and 2 (ground) of input/output connector J3.

4.1.5.2 Remote Loudspeaker:

If the Receiver output is to be transmitted over a telephone cable to a remote point, the cable pair must be connected to terminals 8 and 12 where (after adjusting the Low Level Audio Control) the Receiver audio output level is a nominal 1 mW (0 dBm). It is necessary to use a line amplifier to carry the audio signal from the telephone line to the speaker line at the remote point.

4.1.5.3 RF Gain Control:

This function may be controlled from a remote point by means of a 10K potentiometer.

4.1.5.4 Clarifier:

This function is also controlled from a remote point by means of a 10K potentiometer.

4.1.5.5 Squelch ON/OFF:

This function is remote controlled by grounding the squelch ON/OFF line at the remote point. The squelch circuit is disabled when the line is grounded. The total loop resistance should not exceed 2000 ohms.

4.1.5.6 Mode Select:

The Receiver can from a remote point be put in the SSB mode by grounding the mode select line. If the mode select line is not grounded, the Receiver will be in the AM mode of operation. The total loop resistance of this line should not exceed 2000 ohms.

4.1.5.7 Squelch Controlled Relay:

A squelch controlled relay is provided in the Receiver. This may be used for such various functions as recorder, relay transmitters, indicator lamps, etc. A form C contact arrangement (rated 115V AC/DC, 1 ampere) is available at input/output connector J3. Also available is a single contact that is grounded when the squelch relay is energized. This contact has the same rating as form C contacts.

4.2 Antenna Considerations:

The Receiver is designed to accept a 50 ohm coaxial transmission line, type RG-8/U (or similar). Usual considerations in the installation of the antenna should be followed. Bear in mind that any mismatch in the system will cause a loss of signal level. A perfectly matched RG-8/U cable has approximately 0.6 dB attenuation per 100 feet at 10 MHz, 0.8 dB per 100 feet at 20 MHz and 0.9 dB per 100 feet at 30 MHz.

5. OPERATION

5.1 Operating Controls:

The 2210 Receiver is crystal controlled and fixed-tuned, requiring a minimum of adjustment under normal operating conditions. All operational adjustments are performed by front panel controls as described below.

5.1.1 Power:

A toggle switch marked POWER applies AC power to the Receiver. An associated LED pilot lamp indicates when the power is on. If power is turned on and no signal appears, the fuse on the rear of the chassis should be checked.

5.1.2 RF Gain:

This control determines the amount of gain of the 64 MHz IF amplifier and also serves as the squelch operating level control when the circuit is activated.

In the SSB mode, with the RF Gain control set at maximum sensitivity (full clockwise rotation) the noise generated by the Receiver itself will open the circuit without an incoming signal. When control is set to MINIMUM gain, a signal of at least 10 mV is required to open the circuit.

In the AM mode, Receiver noise will NOT open the circuit, since the circuit is carrier operated.

5.1.3 Clarifier:

The Clarifier control is activated only in SSB. This control decreases or eliminates the garbling of speech resulting when the Transmitter and Receiver are on different frequencies. Range of control is approximately ± 35 Hz.

5.1.4 Squelch:

A toggle switch marked "Squelch - ON/OFF" activates the squelch circuit. An associated LED lights up when the squelch circuit is opened either by an incoming signal or when this function is cut off by the squelch switch.

5.1.5 Mode Select:

The rotary switch marked MODE selects the AM, SSB or REMOTE CONTROL.

5.1.6 High Level Audio Control:

The potentiometer marked AUDIO LEVEL controls the volume of the audio high level output. This output is available on the front panel at the Audio Output jack and is also available on the rear apron of the Receiver on pins 13 and 2 (ground) of the Receiver input/output connector, J3.

5.1.7 Low Level Audio Control:

The Low Level Audio Control located on the rear apron of the Receiver is labeled R5. This potentiometer controls the level of the 600 Ω line audio output. This output is available only at Receiver input/output connector J3 (on pins 8, 10 and 12). Pin 10 is the center tap terminal of the 600 Ω audio output transformer.

5.2 Operating Procedure:

5.2.1 AM Reception:

Turn the Receiver ON. With RF Gain OFF and Mode Select switch on AM, adjust Audio Level to desired output. With Squelch switch ON, squelch level can be reduced by backing off the RF Gain control. When setting squelch level, care should be exercised to avoid de-sensitizing the Receiver to a point where desired signals will be missed.

5.2.2 SSB Reception:

Set the controls as follows: Power, ON; RF Gain at maximum; Clarifier to mid-point; Squelch, OFF; Mode Select switch to SSB. Adjust the Audio Level for desired output level. Squelch circuit can now be activated by setting Squelch switch ON. If background noise or interference during periods of no signal are objectionable, they may be reduced by backing off the RF Gain control. Care should be exercised in this adjustment to avoid de-sensitizing the Receiver to a point where desired signals will be missed.

If the signal being received is slightly off frequency, a garbling of speech will result. Adjust the Clarifier control for the most natural sounding speech.

5.2.3 Remote Operation:

With power switch ON, place Mode Select to REM (remote). Operator controls are now transferred to the remote point.

6. PREVENTIVE MAINTENANCE

6.1 General:

No special preventive maintenance is recommended. The 2210 Receiver uses all solid state integrated circuit and transistor circuitry. This, together with the rugged circuit construction and the low voltage levels in all circuits, insures good overall reliability so that preventive maintenance in the usual sense as applied to tube circuitry is not applicable.

It is recommended, however, that periodic visual inspections be performed and dust, dirt, or other foreign objects be removed.

6.2 Recommended Periodic Performance Check:

Periodic tests should be conducted following installation and thereafter to verify that Receiver performance has not degraded. If the Receiver performance does not meet specifications, refer to CORRECTIVE MAINTENANCE (Section 7) to determine the proper procedure for correcting the problem.

6.2.1 Gain:

Turn the Receiver Power switch ON, Squelch switch ON and Mode Select switch to SSB. Turn the RF Gain to maximum and Audio Level part way. The squelch circuit should be OPEN, squelch lamp ON and noise present in loudspeaker.

6.2.2 Sensitivity:

Connect an RF signal generator to the antenna Input connector and an audio power meter to the audio Output jack. Set the signal generator output for approximately 100 μ V with 30% 1000 Hz modulation. With the Receiver in the AM mode, tune the signal generator for maximum output on the audio power meter. Reduce the signal generator output to rated sensitivity and check to see that the specified output is produced with the specified signal, plus noise-to-noise ratio.

6.2.3 Squelch:

Rotate the RF Gain control to maximum sensitivity, full clockwise. Slowly increase the signal generator output level from minimum output until squelch opens. Squelch should open on rated sensitivity or less input signal.

Turn the RF Gain control fully counterclockwise. Slowly increase the signal generator output until the squelch opens. Input signal should be 10 mV or more, to cause squelch to open.

6.2.4 AGC:

Vary the signal generator output from 1 μ V to 100,000 μ V and observe the power output meter. The audio output change should be less than 3 dB with no indication of distortion.

6.2.5 Control Operation:

Operate the local controls and switches and also remote controls, if they are used. Check controls for mechanical operation. Also, check pots for any noise or roughness.

6.2.6 Relay:

Relay K1 should be inspected occasionally for pitting and corrosion of the contacts. Use a burnishing tool (Western Electric No. 265B or equivalent) for cleaning the contacts.

6.2.7 HF Oscillator:

Connect a frequency counter to HF Oscillator output jack on rear of Receiver J6. Frequency should be within several Hertz of proper crystal frequency.

6.2.8 VHF Oscillator:

Connect a frequency counter to VHF Oscillator output jack on rear of Receiver J5. Frequency should be within several kHz of the proper crystal frequency.

6.2.9 The 1750 kHz Oscillator:

Connect a frequency counter to the 1750 kHz Oscillator output jack on rear of Receiver J4. Frequency should be within ± 2 Hz of 1750 kHz. Set clarifier control to mid point.

7. CORRECTIVE MAINTENANCE

7.1 General:

The Receiver is designed and constructed to assure a long period of uninterrupted service. Routine maintenance is covered by a periodic cleaning and a performance check to locate abnormal components. A few service hints are given below to aid in locating individual components which may cause abnormal operation of the Receiver.

7.1.1 Capacitors:

Bypass or filter capacitors which become open circuited may cause decreased output, poor stability, or complete failure of the Receiver. The defective unit can be located by connecting a good capacitor in parallel with each suspected capacitor. Leaky or short circuited capacitors can be detected by an ohmmeter check. The schematic diagram should be consulted to assure that no resistive component is in parallel with the suspected capacitor (which would make a good capacitor appear to be faulty). In such cases, a definite check can be made by disconnecting one lead of the capacitor from the Receiver circuit.

7.1.2 Resistors:

Defective resistors, sometimes caused by capacitor failure in associated circuits, can be definitely located by measuring the value of each resistor with an ohmmeter. The schematic diagram should be consulted to assure that any particular resistor under test is not connected in parallel with some other circuit element. Otherwise, a false measurement would result. An overloaded resistor may be located by visual inspection of the surface if the resistor becomes scorched due to excessive heat. This may indicate a defective associated solid state device.

7.1.3 Transistors and Integrated Circuits:

A transistor, or any solid state device operated within its ratings (with respect to voltage, power dissipation, and temperature) is expected to have almost unlimited life. Failures in transistorized circuits are more often the result of damage or malfunctioning of some other component. Despite reliability of the transistor itself, failures sometimes occur due to shorts or opens in bias circuitry, temporary overloads, physical damage or even mishaps while servicing. Thus, an evaluation of the transistor becomes necessary.

From a servicing viewpoint, a few simple tests are enough to reveal the majority of troubles. These tests, described below, reveal shorts, opens and excessive leakage. Fortunately, the tests require only an ohmmeter.

7.1.3.1 Testing Junction Transistors:

The transistor contains two PN junctions or diodes. Most of the characteristics of the transistor are tied in with the behavior of the junctions, while the rest of the crystal simply serves as connective material. Damage to the transistor therefore almost always shows up as a malfunctioning of one of the rectifying junctions. The fault may be an open or shorted junction, or excessive reverse current (leakage).

A rough but useful check of the junctions may be made with an ohmmeter. First, the forward resistance of each junction is measured, as shown in Fig. 1. Here, the connections for an NPN transistor are shown. The positive terminal of the ohmmeter is connected to the base. Forward resistance of both junctions is checked by touching the emitter and then the collector terminal in turn with the negative lead. A high reading indicates an open junction. A normal unit should show a reading below 500 ohms. Forward resistance of junctions of a PNP unit is checked with the same setup shown in Fig. 1, but with leads to the ohmmeter reversed.

To check for shorts or excessive leakage, reverse the ohmmeter connections and switch to a higher resistance scale, as shown in Fig. 2. Now the ohmmeter places a reverse bias on each junction in turn, and leakage current is registered on the meter. A low resistance reading indicates a shorted or leaky junction. Low and medium power germanium transistors should show a resistance reading of at least 500K. Typical readings taken with an ohmmeter on the R x 10K scale are 700K to 1.5 megohms. Silicon transistors give much higher resistance readings. Power transistors have larger junctions and therefore greater leakage currents. Reverse-bias resistance readings should be 50K or greater for power transistors.

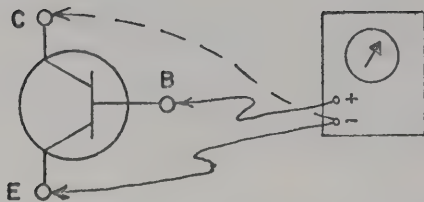


Fig. 1. Method of checking the forward resistance of both junctions.

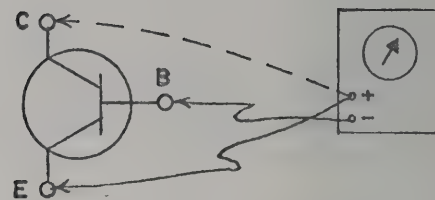


Fig. 2. Method of checking the reverse resistance of both junctions.

7.2 Alignment:

The Receiver, as shipped from the factory, has been completely aligned and should require no further adjustments unless it becomes necessary to replace a defective component. If the channel the Receiver is to operate on must be changed, then new HF oscillator and VHF oscillator crystals must be obtained. Also, it will be necessary to readjust these two modules. No other adjustments will be required for changing frequency.

This paragraph is subdivided to correspond with the various modules in the receiver. If adjustments are performed on a particular module, care must be exercised to insure that these adjustments do not effect a following module. Those adjustments that do alter the characteristics of another module are so noted and the affected module must likewise be readjusted.

7.2.1 1750 kHz Oscillator (AR-1054):

This module supplies the BFO injection voltage for SSB operation. Before adjustments or performance checks are made on this module, the Receiver should have been turned on for at least one hour to stabilize the crystal oven temperature. Refer to dwg. XT-62A for the specifications of the crystal.

When performing the various adjustments on the AM/SSB Receiver, the following test equipment is needed:

Counter

Set the Front Panel controls as follows:

Mode Select
Clarifier

SSB
Mid-point

Connect the counter to J4 located on the rear of the Receiver. The frequency of the oscillator should be 1750.000kHz. Rotate the Clarifier control full clockwise and the frequency should increase by a minimum of 45Hz. Rotate the Clarifier control full counterclockwise and the frequency should be at least 45Hz below 1750.000kHz. If a RF voltmeter or oscilloscope is available, measure the level of the 1750kHz BFO signal at J4. The nominal RMS voltage is 35mV.

The only adjustment required for this module is the correlation capacitor, C1. With the Clarifier set at the mid-point position, adjust C1 for 1750.000kHz.

7.2.2 HF Oscillator (AR-1050):

This module supplies the LO injection voltage. Before adjustments or performance checks are made on this module, the Receiver should have been turned on for at least one hour to stabilize the crystal oven temperature. Refer to dwg. XT-27 for the specifications of the crystal and the formula for determining the crystal frequency.

When performing the various adjustments on the Receiver, the following test equipment is needed:

Counter

Connect the counter to J6 located on the rear of the Receiver. The frequency of the oscillator should be the exact crystal frequency. If an RF voltmeter or oscilloscope is available, measure the level of the HF LO signal at J6. The nominal RMS voltage is 140mV to 350mV.

The only adjustment required for this module is the correlation capacitor C1. Adjust C1 so that the crystal oscillates at the exact frequency required.

7.2.3 VHF Oscillator Module (AR-1049A):

This module supplies the local oscillator injection voltage for the first mixer and along with the HF oscillator, supplies the injection voltage for the second mixer. Refer to dwg. XT-83 for the specifications of the crystal and the formula for determining the crystal frequency.

When performing the various adjustments on the Receiver, the following test equipment is needed:

Counter
DC Voltmeter

Set the Front Panel controls as follows:

Main Power Switch	ON
-------------------	----

The output of the VHF oscillator is terminated by the 64 MHz IF module or a 50 Ω load during the following adjustment:

Connect the DC voltmeter to TP-A on the VHF oscillator board.
Use a 1 volt scale.

Connect the counter to J5 and adjust C204 and C206 for maximum output and proper frequency (within $\pm 0.001\%$ of crystal frequency).
Adjust C210, C217 and C220 for maximum output.

If C204 and C206 are adjusted properly, the oscillator should start up immediately after Receiver has been turned off and cooled for a few minutes.

7.2.4 64 MHz IF Module (AR-1046A):

In normal service, this module will not require any adjustments. The following test equipment is required to align the 64 MHz IF module:

RF Sweep Generator
Variable Power Supply
Diode Detector (positive output)
DC Voltmeter
Oscilloscope

Remove the 1750 kHz IF module and connect the sweep generator output to the receiver antenna jack. Set the center frequency of the sweep generator to the carrier frequency of the receiver with a sweep width of approximately 50 kHz. Adjust the output level to 1500 μ V (-45 dBm). Connect the diode detector RF detector port to the 1750 kHz output (terminal U) of the 64 MHz IF module through a 0.01 μ F coupling capacitor. Connect the diode ground to terminal W. Use very short leads for these connections (not over 3" in length). Load the video output of the diode detector with a 10K Ω resistor and connect to the sweep generator video input. Connect the oscilloscope to the sweep generator.

Set the Front Panel controls as follows:

Mode Select Switch	AM
RF Gain	MAXIMUM
AF Level	MINIMUM
Main Power	ON

Connect the variable power supply (positive lead) to terminal BB. Adjust the variable supply for a potential of 8V on the 64 MHz AGC bus (terminal CC).

Adjust C103, C115, C120, C138, C107 and C139 for maximum output. C138 will tune to two peaks and the larger peak should be used. Set the oscilloscope gain to a level that clearly shows a change of 2 dB in RF level. Adjust C103, C144 and C145 for maximum output and minimum ripple. These adjustments interact with each other and will require re-tweaking to obtain 3 dB or less ripple (or slope). The bandwidth should be approximately 13 kHz.

7.2.5 1750 kHz IF Module (AR-1047):

Two different types of adjustments are required in this module. The free-running frequency of the Voltage Controlled Oscillator (VCO) in the detector IC must be adjusted. Also, the characteristics of the AGC curve are determined by the AGC adjustments in this module.

When performing the various adjustments on the Receiver, the following test equipment is needed:

RF Signal Generator
Audio Power Meter
DC Voltmeter
Loudspeaker

Set the Front Panel controls as follows:

Main Power Switch	ON
Mode Select Switch	AM
Squelch	OFF
RF Gain	MAXIMUM
AF Level	Comfortable listening level.

7.2.5.1 VCO Adjustments:

Set the RF Signal Generator to the carrier frequency, AM mode, 30% modulation and 0.5 μ V output. The signal should have a clean undistorted sound with only noise in the background. If the signal sounds distorted or has a scratchy sound, adjust the VCO potentiometer, R327, for minimum distortion or scratchiness. This is a broad adjustment and should be centered. The adjustment should be checked after the receiver has warmed up.

7.2.5.2 AGC Adjustments:

Set the RF Signal Generator to 1 μ V and 30% modulation. Connect the Audio Power Meter to the audio output jack of the Receiver. Advance the appropriate AF Level control so that the audio output power does not exceed 10 mW at the 600 Ω output or 0.5W at the 8 Ω output during this test.

Again, advance the Signal Generator from $1\mu\text{V}$ to $100,000\mu\text{V}$ while observing the Audio Power Meter. The audio output should not vary more than 6 dB.

Return the Signal Generator to $1\mu\text{V}$ and note the audio output level. Disconnect the Signal Generator from the receiver antenna jack and the audio output should decrease by a minimum of 8 dB. If these two conditions are met, then the AGC is properly adjusted. With a $1\mu\text{V}$ signal, the AGC voltage in the 64 MHz IF Module is greater than 8 volts and the AGC voltage in the 1750 kHz IF Module is greater than 5.5 volts.

To adjust the AGC circuit, set the Signal Generator to $1\mu\text{V}$. Adjust R352 in the 1750 kHz IF Module for approximately 5.5 volts on terminal BB of the 64 MHz Module when the receiver is cold or approximately 7.5 volts if the receiver has been on for a day or more. Then adjust R128 in the 64 MHz Module for 8 volts on terminal CC on the 64 MHz Module if the receiver is cold or approximately 8.5 volts if the receiver has been on for a day or more. It may be necessary to repeat the above adjustments as the adjustments interact with each other. While observing the Audio Power Meter and the AGC voltage in the 1750 kHz IF, remove the Signal Generator from the receiver antenna jack. The Audio Power Meter should decrease by about 6 dB if the receiver is cold and by about 10 dB if the receiver has been on for a day or so. Advance the Signal Generator from $1\mu\text{V}$ to $100,000\mu\text{V}$. The Audio Power Meter should show an increase of less than 6 dB.

7.2.6 Audio Module (AR-1048):

The only adjustments required in this Module are the squelch threshold points for AM and SSB.

When performing the various adjustments on the receiver, the following test equipment is needed:

RF Signal Generator
Audio Power Meter

Set the Front Panel controls as follows:

Main Power Switch	ON
Squelch	ON
RF Gain	MAXIMUM
AF Level	Convenient Level

7.2.6.1 AM Squelch Threshold Adjustment:

Set Mode Select Switch to the AM position. Adjust R404 to cause the squelch to open at 0.3 μ V (nominal).

7.2.6.2 SSB Squelch Threshold Adjustment:

Set Mode Select Switch to the SSB position. Adjust R409 to cause the squelch to open at 0.3 μ V when the receiver is cold or 1.0 μ V when the receiver has been on for a day or more.

8. OVERHAUL PROCEDURE

No overhaul procedure is prescribed for this equipment.

9. MODIFICATIONS

No factory modifications were made to this equipment.

10. PARTS LIST

10.1 Introduction:

This section contains useful information concerning each part used in this equipment and information for ordering replacement parts.

10.2 Using the Parts List:

The Parts List information provided as follows:

- a. Circuit symbol designator number.
- b. AEROCOM part number.
- c. The part.
- d. Description of the part.
- e. The abbreviated name of the manufacturer of the part.
- f. The manufacturer's part number or type number.

10.3 Replacement parts ordering information:

To order a replacement part, address order or inquiry to:

AEROCOM
Spare Parts Contracts Administrator
3090 Southwest 37th Avenue
Miami, Florida 33133 USA

To insure prompt and proper replacement parts, the following information must be supplied:

1. Equipment model number.
2. Equipment serial number.
3. Module name and number (if applicable).

4. Letter designation of all modifications which have been made to the equipment (if applicable).
5. Circuit symbol designator.
6. AEROCOM part number.
7. The part (key word).
8. Description of the part.
9. The abbreviated name of the manufacturer of the part.
10. The manufacturer's part or type number.

To order a part that is not listed in the Parts List, give a complete description of the part, its function and its location.

10.4 Integrated Circuit Interchangeability:

Many integrated circuits widely used today are manufactured by more than one manufacturer. When this is done, the basic IC number remains in the manufacturer's part number along with the addition of prefix and suffix letters and/or numbers.

Several ICs used in this equipment fall in this class. Refer to Table 10-1 for the complete part number used by the various manufacturers that supply AEROCOM.

Aerocom Part No.	IC No.	Fairchild	Motorola	National Semiconductor	Signetics
A-4320	---	7818KC	MC7818CK	LM340-18K	---
A-3615	741	741 TC	MC1741 CP1	LM741 CN	741 CV
A-4316	---	---	MC3302P	LM339N	---

Table 10-1 IC INTERCHANGEABILITY

Sym.	Aerocom		Description	Mfrs.	
	Part No.	Part		Code*	P/N
C1	A-5192	Capacitor	Electrolytic, 2000 μ F, 25V	SPR	TVA-1213
C2	A-2915	Capacitor	Electrolytic, 6.8 μ F, 35V	UGC	T368B685M035AS
C3	A-5113	Capacitor	Ceramic disc, .001 μ F, 1.4 kV	SPR	19C251
C4	A-5113	Capacitor	Ceramic disc, .001 μ F, 1.4 kV	SPR	19C251
C5	A-5126	Capacitor	Ceramic disc, .001 μ F, 500 V	ERI	801-000-X5F0-102K
C6	A-2761	Capacitor	Ceramic disc, .1 μ F, 20 V	CRL	UK20-104
C7	NOT USED				
C8	A-2915	Capacitor	Electrolytic, 6.8 μ F, 35V	UGC	T368B685M035AS
C9	A-2783	Capacitor	Mica, 27 pF, 500 V	ELM	DM-15
C10	A-1028	Capacitor	Mica, 150 pF, 500 V	ELM	DM-15
C11	A-1100	Capacitor	Mica, 300 pF, 500 V	ELM	DM-15
C12	A-1100	Capacitor	Mica, 300 pF, 500 V	ELM	DM-15
C13	A-1028	Capacitor	Mica, 150 pF, 500 V	ELM	DM-15
C14	A-2783	Capacitor	Mica, 27 pF, 500 V	ELM	DM-15
C15	A-1159	Capacitor	Ceramic disc, .01 μ F, 1 kV	CRL	DD-103
D1	A-7429	Diode	LED	MON	MV5026
D2	A-7429	Diode	LED	MON	MV5026
D3	A-7371	Diode	Silicon, 1 A, 800 V	GE	1N5062
D4	A-7371	Diode	Silicon, 1 A, 800 V	GE	1N5062
D5	A-7371	Diode	Silicon, 1 A, 800 V	GE	1N5062
F1	A-597	Fuse	Quick acting, 1/2A	BUS	AGC
FL1	A-4027	Filter	SSB Bandpass	BKH	1750-2400-8AL
FL2	A-5089	Filter	AM Bandpass	BKH	1750-6000-8AM
IC1	A-4320	IC	Voltage regulator, 18 V	FCD	7818KC
J1	A-1641	Connector	Speaker jack	SW	L-11
J2	A-1632	Connector	AC receptacle	SW	AC3G
J3	A-3931	Connector	20 pin receptacle	AMP	126-807
J4	A-1647	Connector	BNC panel receptacle	AMP	31-003-1050
J5	A-1647	Connector	BNC panel receptacle	AMP	31-003-1050
J6	A-1647	Connector	BNC panel receptacle	AMP	31-003-1050
J7	A-3917	Connector	N panel receptacle	AMP	9575
J8	A-3931	Connector	20 pin receptacle	AMP	126-807
J9	A-3940	Connector	Phono jack	SW	3501FR
K1	A-2065	Relay	4PDT, 24V	ALL	T163-4C-24VDC
L1	A-9818	Inductor	Molded, .47 μ H	DEL	1025-12
L2	A-9818	Inductor	Molded, .47 μ H	DEL	1025-12
L3	A-9818	Inductor	Molded, .47 μ H	DEL	1025-12
P1	A-3930	Connector	20 pin plug	AMP	126-806

* Or equal

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PARTS LIST
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Sym.	Aerocom		Description	Mfrs.	
	Part No.	Part		Code*	P/N
R1	A-8774	Resistor	Potentiometer, 25K	AB	70A5N048F253U
R2	A-8773	Resistor	Potentiometer, 10K	AB	70A5N048F103U
R3	A-8773	Resistor	Potentiometer, 10K	AB	70A5N048F103U
R4	A-8302	Resistor	Comp., 1W, 5%, 560	AB	GB
R5	A-8775	Resistor	Potentiometer, 25K	AB	YN253U
R6***	A-8775	Resistor	Potentiometer, 25K	AB	YN253U
R7	A-8150	Resistor	Comp., 1/2W, 5%, 1K	AB	EB
R8	A-8569**	Resistor	Comp., 1/4W, 5%, 6.8K	AB	CB
R9	A-8561	Resistor	Comp., 1/4W, 5%, 3.3K	AB	CB
R10	A-8561	Resistor	Comp., 1/4W, 5%, 3.3K	AB	CB
S1	A-3339	Switch	Rotary, 4 pole, 6 pos.	CRL	SA-210-2B-120
S2	A-2488	Switch	Toggle, DPST	CEI	216-73
S3	A-2488	Switch	Toggle, DPST	CEI	216-73
S4	A-2489	Switch	Slide, DPDT	CWC	G-326-0004
T1	A-9461	Transformer	Power	TTI	11268
XIC1	A-2202	Socket	TO-3 transistor	AUG	8080-1G1
XF1	A-2164	Socket	Fuseholder, indicating	BUS	HKL
XK1	A-2163	Socket	Relay	ALL	30055-2

** Factory selected to center clarifier control. Nominally 6.8K.

*** Used only in Modification B.

Sym.	Aerocom Part No.	Part	Description	Mfrs.	
				Code*	P/N
C101	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C102	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
C103	A-5162	Capacitor	Ceramic trimmer, 3-15 pF	ERI	538-011D3-15
C104	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
C105	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
C106	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
C107	A-5162	Capacitor	Ceramic trimmer, 3-15 pF	ERI	538-011D3-15
C108	A-1055	Capacitor	Mica, 390 pF, 500 V	ELM	DM-15
C109	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
C110	A-1055	Capacitor	Mica, 390 pF, 500 V	ELM	DM-15
C111	A-1020	Capacitor	Mica, 15 pF, 500 V	ELM	DM-15
C112	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
C113	A-1127	Capacitor	Mica, 10 pF, 500V	ELM	DM-15
C114	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
C115	A-5162	Capacitor	Ceramic trimmer, 3-15 pF	ERI	538-011D3-15
C116	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
C117	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
C118	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
C119	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
C120	A-5162	Capacitor	Ceramic trimmer, 3-15 pF	ERI	538-011D3-15
C121	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
C122	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
C123	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
C124	A-1020	Capacitor	Mica, 15 pF, 500V	ELM	DM-15
C125	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
C126	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
C127	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
C128	A-1127	Capacitor	Mica, 10 pF, 500V	ELM	DM-15
C129	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C130	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C131	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
C132	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C133	A-1171	Capacitor	Mica, 5 pF, 500 V	ELM	DM-15
C134	A-1020	Capacitor	Mica, 15 pF, 500 V	ELM	DM-15
C135	A-1021	Capacitor	Mica, 24 pF, 500 V	ELM	DM-15
C136	A-1020	Capacitor	Mica, 15 pF, 500 V	ELM	DM-15
C137	A-5209	Capacitor	Ceramic disc, .001 μ F, 500 V	ERI	801-012-X5F0-102K
C138	A-5111	Capacitor	Ceramic trimmer, 9-35 pF	ERI	538-011D9-35
C139	A-5111	Capacitor	Ceramic trimmer, 9-35 pF	ERI	538-011D9-35
C140	A-5209	Capacitor	Ceramic disc, .001 μ F, 500 V	ERI	801-012-X5F0-102K

* Or equal
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PARTS LIST

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Sym.	Aerocom			Mfrs.	
	Part No.	Part	Description	Code*	P/N
C141	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C142	A-5196	Capacitor	Mica, 360 pF, 500 V	ELM	DM-15
C143	A-2915	Capacitor	Electrolytic, 6.8 μ F, 35V	UCC	T368B685M035AS
C144	A-5195	Capacitor	Ceramic trimmer, 5-25 pF	ERI	518-000A5-25
C145	A-5195	Capacitor	Ceramic trimmer, 5-25 pF	ERI	518-000A5-25
C146	A-5135	Capacitor	Mica, 12 pF, 500V	ELM	DM-15
C147	A-2915	Capacitor	Electrolytic, 6.8 μ F, 35 V	UCC	T368B685M035AS
D101	A-7350	Diode	Zener, 95V, 1W	MOT	1N4744
FL101	A-5094	Filter	Crystal, 64 MHz	PTI	1834
IC101	A-3615	IC	Op. Amp, compensated	NSC	LM741CN
IC102	A-4319	IC	RF amplifier	RCA	CA3028AF
L101	A-9812	Inductor	Molded, RF, 4.7 μ H	DEL	1025-36
L102	A-9808	Inductor	Molded, RF, .33 μ H	MIL	9230-08
L103	A-9811	Inductor	Molded, RF, .22 μ H	DEL	1025-04
L104	A-9812	Inductor	Molded, RF, 4.7 μ H	DEL	1025-36
L105	A-9812	Inductor	Molded, RF, 4.7 μ H	DEL	1025-36
L106	A-9812	Inductor	Molded, RF, 4.7 μ H	DEL	1025-36
L107	A-9812	Inductor	Molded, RF, 4.7 μ H	DEL	1025-36
L108	A-9812	Inductor	Molded, RF, 4.7 μ H	DEL	1025-36
L109	A-9812	Inductor	Molded, RF, 4.7 μ H	DEL	1025-36
L110	A-3730	Inductor	Air core, .15 μ H	MIL	75F157mpc
L111	A-9815	Inductor	Molded, RF, 1.2 μ H	DEL	1025-22
L112	A-9812	Inductor	Molded, RF, 4.7 μ H	DEL	1025-36
L113	A-9812	Inductor	Molded, RF, 4.7 μ H	DEL	1025-36
L114	A-3730	Inductor	Air core, .15 μ H	MIL	75F157mpc
L115	A-9813	Inductor	Molded, RF, 22 μ H	DEL	1025-52
Q101	A-7384	Transistor	Dual gate MOSFET	RCA	3N140
Q102	A-7384	Transistor	Dual gate MOSFET	RCA	3N140
Q103	A-7384	Transistor	Dual gate MOSFET	RCA	3N140
Q104	A-3209	Transistor	Dual gate MOSFET	RCA	3N141
Q105	A-3209	Transistor	Dual gate MOSFET	RCA	3N141
R101	A-8565	Resistor	Comp., 1/4W, 5%, 4.7K	AB	CB
R102	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB	CB
R103	A-8549	Resistor	Comp., 1/4W, 5%, 1K	AB	CB
R104	A-8597	Resistor	Comp., 1/4W, 5%, 100K	AB	CB
R105	A-8545	Resistor	Comp., 1/4W, 5%, 680 Ω	AB	CB
R106	A-8597	Resistor	Comp., 1/4W, 5%, 100K	AB	CB
R107	A-8589	Resistor	Comp., 1/4W, 5%, 47K	AB	CB
R108	A-8549	Resistor	Comp., 1/4W, 5%, 1K	AB	CB
R109	A-8545	Resistor	Comp., 1/4W, 5%, 680 Ω	AB	CB
R110	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB	CB

Sym.	Aerocom			Description	Mfrs.	
	Part No.	Part			Code*	P/N
R111	A-8565	Resistor	Comp., 1/4W, 5%, 4.7K	AB		CB
R112	A-8549	Resistor	Comp., 1/4W, 5%, 1K	AB		CB
R113	A-8545	Resistor	Comp., 1/4W, 5%, 680Ω	AB		CB
R114	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB		CB
R115	A-8565	Resistor	Comp., 1/4W, 5%, 4.7K	AB		CB
R116	A-8561	Resistor	Comp., 1/4W, 5%, 3.3K	AB		CB
R117	A-8549	Resistor	Comp., 1/4W, 5%, 1K	AB		CB
R118	A-8551	Resistor	Comp., 1/4W, 5%, 1.2K	AB		CB
R119	A-8559	Resistor	Comp., 1/4W, 5%, 2.7K	AB		CB
R120	A-8559	Resistor	Comp., 1/4W, 5%, 2.7K	AB		CB
R121	A-8545	Resistor	Comp., 1/4W, 5%, 680Ω	AB		CB
R122	A-8563	Resistor	Comp., 1/4W, 5%, 3.9K	AB		CB
R123	A-8565	Resistor	Comp., 1/4W, 5%, 4.7K	AB		CB
R124	A-8589	Resistor	Comp., 1/4W, 5%, 47K	AB		CB
R125	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB		CB
R126	NOT USED					
R127	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB		CB
R128	A-8765	Resistor	Potentiometer, 5K	BEC	72PM-5K	
R129	A-8565	Resistor	Comp., 1/4W, 5%, 4.7K	AB		CB
R130/R144	A-8565	Resistor	Comp., 1/4W, 5%, 4.7K	AB		CB
R131	A-8563	Resistor	Comp., 1/4W, 5%, 3.9K	AB		CB
R132	A-8581	Resistor	Comp., 1/4W, 5%, 22K	AB		CB
R133	A-8543	Resistor	Comp., 1/4W, 5%, 560Ω	AB		CB
R134	A-8583	Resistor	Comp., 1/4W, 5%, 27K	AB		CB
R135	A-8545	Resistor	Comp., 1/4W, 5%, 680Ω	AB		CB
R136	A-8549	Resistor	Comp., 1/4W, 5%, 1K	AB		CB
R137	A-8557	Resistor	Comp., 1/4W, 5%, 2.2K	AB		CB
R138	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB		CB
R139	A-8541	Resistor	Comp., 1/4W, 5%, 470Ω	AB		CB
R140	A-8519	Resistor	Comp., 1/4W, 5%, 56Ω	AB		CB
R141/R143	A-8557	Resistor	Comp., 1/4W, 5%, 2.2KΩ	AB		CB
T101	AR-3824	Transformer	64 MHz	AER		AR-3824
T102	AR-3825	Transformer	64 MHz	AER		AR-3825
T103	AR-3825	Transformer	64 MHz	AER		AR-3825
XIC101	A-2262	Socket	8 pin dual-in-line	ASI		583640-1
XIC102	A-2262	Socket	8 pin dual-in-line	ASI		583640-1
XQ101	A-2239	Socket	Teflon, TO-72	AUG		8060-1G4
XQ102	A-2239	Socket	Teflon, TO-72	AUG		8060-1G4
XQ103	A-2239	Socket	Teflon, TO-72	AUG		8060-1G4
XQ104	A-2239	Socket	Teflon, TO-72	AUG		8060-1G4
XQ105	A-2239	Socket	Teflon, TO-72	AUG		8060-1G4
Z101	A-5903	Mixer	Double balanced	WAT		M9E

*Or equal
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PARTS LIST
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Sym.	Aerocom			Mfrs.	
	Part No.	Part	Description	Code*	P/N
C301	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C302	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C303	A-5183	Capacitor	Electrolytic, .33 μ F, 35V	UCC	T368A334M035AS
C304	A-2761	Capacitor	Ceramic disc, .1 μ F, 20V	CRL	UK20-104
C305	A-2915	Capacitor	Electrolytic, 6.8 μ F, 35V	UCC	T368B685M035AS
C306	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C307	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C308	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C309	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C310	A-2761	Capacitor	Ceramic disc, .1 μ F, 20V	CRL	UK20-104
C311	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C312	A-2826	Capacitor	Ceramic disc, .1 μ F, 10V	CRL	UK10-104
C313	A-1055	Capacitor	Mica, 390 pF, 500V	ELM	DM-15
C314	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C315	A-2761	Capacitor	Ceramic disc, .1 μ F, 20V	CRL	UK20-104
C316	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C317	A-2826	Capacitor	Ceramic disc, .1 μ F, 10V	CRL	UK10-104
C318	A-1055	Capacitor	Mica, 390 pF, 500 V	ELM	DM-15
C319	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C320	A-2761	Capacitor	Ceramic disc, .1 μ F, 20V	CRL	UK20-104
C321	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C322	A-2826	Capacitor	Ceramic disc, .1 μ F, 10V	CRL	UK10-104
C323	A-2880	Capacitor	Mica, 1000 pF, 100V	ELM	DM-15
C324	A-1030	Capacitor	Mica, 500 pF, 500V	ELM	DM-15
C325	A-1084	Capacitor	Mica, 75 pF, 500V	ELM	DM-15
C326	A-1084	Capacitor	Mica, 75 pF, 500V	ELM	DM-15
C327	A-5211	Capacitor	Ceramic, .1 μ F, 100V	ERI	8131-100-651-104M
C328	A-5211	Capacitor	Ceramic, .1 μ F, 100V	ERI	8131-100-651-104M
C329	A-2880	Capacitor	Mica, 1000 pF, 100V	ELM	DM-15
C330	A-5211	Capacitor	Ceramic, .1 μ F, 100V	ERI	8131-100-651-104M
C331	A-5211	Capacitor	Ceramic, .1 μ F, 100V	ERI	8131-100-651-104M
C332	A-2761	Capacitor	Ceramic disc, .1 μ F, 20V	CRL	UK20-104
C333	A-5142	Capacitor	Mica, 270 pF, 500V	ELM	DM-15
C334	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C335	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C336	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C337	A-1127	Capacitor	Mica, 10 pF, 500V	ELM	DM-15
C338	A-1127	Capacitor	Mica, 10 pF, 500V	ELM	DM-15
C339	A-1030	Capacitor	Mica, 500 pF, 500V	ELM	DM-15
C340	A-2915	Capacitor	Electrolytic, 6.8 μ F, 35V	UCC	T368B685M035AS
C341	A-2915	Capacitor	Electrolytic, 6.8 μ F, 35V	UCC	T368B685M035AS
C342	A-5211	Capacitor	Ceramic disc, 0.1 μ F, 100V	ERI	8131-100-651-104M

Sym.	Aerocom			Mfrs.	
	Part No.	Part	Description	Code*	P/N
D301	A-7371	Diode	Silicon, power, 1 A, 800V	GE	1N5062
D302	A-7371	Diode	Silicon, power, 1 A, 800V	GE	1N5062
D303	A-7328	Diode	Germanium, small signal	TRN	1N67A
D304	A-7328	Diode	Germanium, small signal	TRN	1N67A
D305	A-7328	Diode	Germanium, small signal	TRN	1N67A
D306	A-7323	Diode	Silicon, small signal, 75V	TI	1N914
D307		NOT USED			
D308	A-7367	Diode	Zener, 9.1V, 400 mW	TI	1N757
D309	A-7350	Diode	Zener, 15V., 1W	MOT	1N4744
IC301	A-4322	IC	Dual switch	SIL	DG190BP
IC302	A-3628	IC	PLL, VCO, product detector	SIG	NE561B
IC303	A-4324	IC	Dual comparator	NSC	LM319N
IC304	A-3627	IC	Op. Amp, compensated	NSC	LM741CN
L301		NOT USED			
L302	A-9813	Inductor	Molded, RF, 22 μ H	DEL	1025-52
L303	A-9829	Inductor	Molded, RF, 100 μ H	DEL	1025-68
L304	A-9813	Inductor	Molded, RF, 22 μ H	DEL	1025-52
L305	A-9829	Inductor	Molded, RF, 100 μ H	DEL	1025-68
L306	A-9813	Inductor	Molded, RF, 22 μ H	DEL	1025-52
L307	A-9829	Inductor	Molded, RF, 100 μ H	DEL	1025-68
L308	A-9829	Inductor	Molded, RF, 100 μ H	DEL	1025-68
L309	A-9829	Inductor	Molded, RF, 100 μ H	DEL	1025-68
L310	A-9829	Inductor	Molded, RF, 100 μ H	DEL	1025-68
L311	A-9829	Inductor	Molded, RF, 100 μ H	DEL	1025-68
P301	A-3941	Connector	Phono plug	SW	3502
Q301	A-7384	Transistor	Dual gate MOSFET	RCA	3N140
Q302	A-7384	Transistor	Dual gate MOSFET	RCA	3N140
Q303	A-7384	Transistor	Dual gate MOSFET	RCA	3N140
Q304	A-3231	Transistor	FET, N channel	MOT	2N3824
Q305	A-3206	Transistor	FET, P channel	MOT	2N5265
R301	A-8563	Resistor	Comp., 1/4W, 5%, 3.9K	AB	CB
R302	A-8575	Resistor	Comp., 1/4W, 5%, 12K	AB	CB
R303	A-8575	Resistor	Comp., 1/4W, 5%, 12K	AB	CB
R304	A-8577	Resistor	Comp., 1/4W, 5%, 15K	AB	CB
R305	A-8587	Resistor	Comp., 1/4W, 5%, 39K	AB	CB

* Or equal
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Sym.	Aerocom			Mfrs.	
	Part No.	Part	Description	Code*	P/N
R306	A-8549	Resistor	Comp., 1/4W, 5%, 1K	AB	CB
R307	A-8545	Resistor	Comp., 1/4W, 5%, 680Ω	AB	CB
R308	A-8555**	Resistor	Comp., 1/4W, 5%, 1.8K	AB	CB
R309	A-8577	Resistor	Comp., 1/4W, 5%, 15K	AB	CB
R310	A-8587	Resistor	Comp., 1/4W, 5%, 39K	AB	CB
R311	A-8549	Resistor	Comp., 1/4W, 5%, 1K	AB	CB
R312	A-8549	Resistor	Comp., 1/4W, 5%, 1K	AB	CB
R313	A-8545	Resistor	Comp., 1/4W, 5%, 680Ω	AB	CB
R314	A-8561**	Resistor	Comp., 1/4W, 5%, 3.3K	AB	CB
R315	A-8577	Resistor	Comp., 1/4W, 5%, 15K	AB	CB
R316	A-8587	Resistor	Comp., 1/4W, 5%, 39K	AB	CB
R317	A-8545	Resistor	Comp., 1/4W, 5%, 680Ω	AB	CB
R318	A-8561**	Resistor	Comp., 1/4W, 5%, 3.3K	AB	CB
R319	A-8553	Resistor	Comp., 1/4W, 5%, 1.5K	AB	CB
R320	A-8567	Resistor	Comp., 1/4W, 5%, 5.6K	AB	CB
R321	A-8560	Resistor	Comp., 1/4W, 5%, 3K	AB	CB
R322	A-8560	Resistor	Comp., 1/4W, 5%, 3K	AB	CB
R323	A-8597	Resistor	Comp., 1/4W, 5%, 100K	AB	CB
R324	A-8553	Resistor	Comp., 1/4W, 5%, 1.5K	AB	CB
R325	A-8567	Resistor	Comp., 1/4W, 5%, 5.6K	AB	CB
R326	A-8597	Resistor	Comp., 1/4W, 5%, 100K	AB	CB
R327	A-8760	Resistor	Potentiometer, 25K	BEC	72PM-25K
R328	A-8565	Resistor	Comp., 1/4W, 5%, 4.7K	AB	CB
R329	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB	CB
R330	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB	CB
R331	A-8611	Resistor	Comp., 1/4W, 5%, 390K	AB	CB
R332	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB	CB
R333	A-8567	Resistor	Comp., 1/4W, 5%, 5.6K	AB	CB
R334	A-8571	Resistor	Comp., 1/4W, 5%, 8.2K	AB	CB
R335	A-8637	Resistor	Comp., 1/4W, 5%, 4.7M	AB	CB
R336	A-8551	Resistor	Comp., 1/4W, 5%, 1.2K	AB	CB
R337	A-8613	Resistor	Comp., 1/4W, 5%, 470K	AB	CB
R338	A-8567	Resistor	Comp., 1/4W, 5%, 5.6K	AB	CB
R339	A-8559	Resistor	Comp., 1/4W, 5%, 2.7K	AB	CB
R340	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB	CB
R341	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB	CB
R342	A-8613	Resistor	Comp., 1/4W, 5%, 470K	AB	CB
R343	A-8549	Resistor	Comp., 1/4W, 5%, 1K	AB	CB
R344	NOT USED				
R345	NOT USED				

** Factory selected for optimum gain to provide for quieting and AGC performance. Nominal values shown.

Sym.	Aerocom		Description	Mfrs.	
	Part No.	Part		Code*	P/N
R346	A-8575	Resistor	Comp., 1/4W, 5%, 12K	AB	CB
R347	A-8563	Resistor	Comp., 1/4W, 5%, 3.9K	AB	CB
R348	A-8575	Resistor	Comp., 1/4W, 5%, 12K	AB	CB
R349	A-8565	Resistor	Comp., 1/4W, 5%, 4.7K	AB	CB
R350/R356	A-8565	Resistor	Comp., 1/4W, 5%, 4.7K	AB	CB
R351		NOT USED			
R352	A-8770	Resistor	Potentiometer, 2K	BEC	72PM-2K
R353	A-8613	Resistor	Comp., 1/4W, 5%, 470K	AB	CB
R354	A-8519	Resistor	Comp., 1/4W, 5%, 56Ω	AB	CB
R355	A-8597	Resistor	Comp., 1/4W, 5%, 100K	AB	CB
XIC301	A-2257	Socket	16 pin, dual-in-line	PAM	583529-1
XIC302	A-2257	Socket	16 pin, dual-in-line	PAM	583529-1
XIC303	A-2256	Socket	14 pin, dual-in-line	PAM	583527-1
XIC304	A-2262	Socket	8 pin, dual-in-line	PAM	583640-1
XQ301	A-2239	Socket	Teflon, TO-72	AUG	8060-1G4
XQ302	A-2239	Socket	Teflon, TO-72	AUG	8060-1G4
XQ303	A-2239	Socket	Teflon, TO-72	AUG	8060-1G4
XQ304	A-2239	Socket	Teflon, TO-72	AUG	8060-1G4
XQ305	A-2239	Socket	Teflon, TO-72	AUG	8060-1G4

Sym.	Aerocom			Mfrs.	
	Part No.	Part	Description	Code*	P/N
C401	A-2915	Capacitor	Electrolytic, 6.8 μ F, 35V	UCC	T368B685M035AS
C402	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C403	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C404	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C405	A-5211	Capacitor	Ceramic, .1 μ F, 100V	ERI	8131-100-651-104M
C406	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C407	A-1030	Capacitor	Mica, 500 pF, 500 V	ELM	DM-15
C408	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C409	A-2912	Capacitor	Mylar, .033 μ F, 50 V	GE	65F10AA333
C410	A-2915	Capacitor	Electrolytic, 6.8 μ F, 35V	UCC	T368B685M035AS
C411	A-5211	Capacitor	Ceramic, .1 μ F, 100V	ERI	8131-100-651-104M
C412	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C413	A-1030	Capacitor	Mica, 500 pF, 500V	ELM	DM-15
C414	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C415	A-2917	Capacitor	Electrolytic, 22 μ F, 15V	UCC	T368B226M015AS
C416	A-2912	Capacitor	Mylar, .033 μ F, 50V	GE	65F10AA333
C417	A-2915	Capacitor	Electrolytic, 6.8 μ F, 35V	UCC	T368B685M035AS
C418	A-2851	Capacitor	Electrolytic, 100 μ F, 16V	SPR	TE-1162
C419	A-2883	Capacitor	Mylar, .01 μ F, 50V	GE	65F10AA103
C420	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C421	A-2915	Capacitor	Electrolytic, 6.8 μ F, 35V	UCC	T368B685M035AS
C422	A-5211	Capacitor	Ceramic, .1 μ F, 100V	ERI	8131-100-651-104M
IC401	A-4316	IC	Quad comparator	NSC	LM339N
IC402	A-4316	IC	Quad comparator	NSC	LM339N
IC403	A-3634	IC	Transistor array	RCA	CA3081
IC404	AR-6438	IC	Dual attenuator	AER	AR-6438
IC405	A-4317	IC	Dual audio amplifier	NSC	LM377N
R401	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB	CB
R402	A-8585	Resistor	Comp., 1/4W, 5%, 33K	AB	CB
R403	A-8561	Resistor	Comp., 1/4W, 5%, 3.3K	AB	CB
R404	A-8758	Resistor	Potentiometer, 1K	BEC	72PM-1K
R405	A-8567	Resistor	Comp., 1/4W, 5%, 5.6K	AB	CB
R406	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB	CB
R407	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB	CB
R408	A-8553**	Resistor	Comp., 1/4W, 5%, 1.5K	AB	CB
R409	A-8758	Resistor	Potentiometer, 1K	BEC	72PM-1K
R410	A-8557	Resistor	Comp., 1/4W, 5%, 2.2K	AB	CB

** Factory selected for optimum squelch (USB) operation. Nominally 1.5K

Sym.	Aerocom Part No.	Part	Description	Mfrs.	
				Code*	P/N
R411	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB	CB
R412	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB	CB
R413	A-8581	Resistor	Comp., 1/4W, 5%, 22K	AB	CB
R414	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB	CB
R415	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB	CB
R416	A-8577	Resistor	Comp., 1/4W, 5%, 15K	AB	CB
R417	A-8565	Resistor	Comp., 1/4W, 5%, 4.7K	AB	CB
R418	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB	CB
R419	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB	CB
R420	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB	CB
R421	A-8559	Resistor	Comp., 1/4W, 5%, 2.7K	AB	CB
R422	A-8541	Resistor	Comp., 1/4W, 5%, 470Ω	AB	CB
R423	A-8565	Resistor	Comp., 1/4W, 5%, 4.7K	AB	CB
R424	A-8549	Resistor	Comp., 1/4W, 5%, 1K	AB	CB
R425	A-8549	Resistor	Comp., 1/4W, 5%, 1K	AB	CB
R426	A-8549	Resistor	Comp., 1/4W, 5%, 1K	AB	CB
R427	A-8306	Resistor	Comp., 1W, 5%, 820Ω	AB	EB
R428	A-8565	Resistor	Comp., 1/4W, 5%, 4.7K	AB	CB
R429	A-8597	Resistor	Comp., 1/4W, 5%, 100K	AB	CB
R430	A-8575	Resistor	Comp., 1/4W, 5%, 12K	AB	CB
R431	A-8609	Resistor	Comp., 1/4W, 5%, 330K	AB	CB
R432	A-8565	Resistor	Comp., 1/4W, 5%, 4.7K	AB	CB
R433	A-8597	Resistor	Comp., 1/4W, 5%, 100K	AB	CB
R434	A-8575	Resistor	Comp., 1/4W, 5%, 12K	AB	CB
R435	A-8604	Resistor	Comp., 1/4W, 5%, 200K	AB	CB
R436	A-8565	Resistor	Comp., 1/4W, 5%, 4.7K	AB	CB
R437	A-8509	Resistor	Comp., 1/4W, 5%, 22Ω	AB	CB
R438	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB	CB
R439	A-8613	Resistor	Comp., 1/4W, 5%, 470K	AB	CB
T401	A-9426	Transformer	600 Ω to 600 Ω CT	STN	PCT-77
XIC401	A-2256	Socket	14 pin, dual-in-line	PAM	583527-1
XIC402	A-2256	Socket	14 pin, dual-in-line	PAM	583527-1
XIC403	A-2257	Socket	16 pin, dual-in-line	PAM	583529-1
XIC404	A-2256	Socket	14 pin, dual-in-line	PAM	583527-1
XIC405	A-2256	Socket	14 pin, dual-in-line	PAM	583527-1

* Or equal
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Sym.	Aerocom Part No.	Part	Description	Mfrs.	
				Code*	P/N
C201	A-1127	Capacitor	Mica, 10pF, 500V	ELM	DM-15
C202	A-1084	Capacitor	Mica, 75pF, 500V	ELM	DM-15
C203	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
C204	A-5111	Capacitor	Ceramic trimmer, 9-35pF	ERI	538-000D9-35
C205	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
C206	A-5162	Capacitor	Ceramic trimmer, 3-15pF	ERI	538-011D3-15
C207	A-1028	Capacitor	Mica, 150pF, 500V	ELM	DM-15
C208	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
C209	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
C210	A-5162	Capacitor	Ceramic trimmer, 3-15pF	ERI	538-011D3-15
C211	A-1028	Capacitor	Mica, 150pF, 500V	ELM	DM-15
C212	A-1028	Capacitor	Mica, 150pF, 500V	ELM	DM-15
C213	A-1023	Capacitor	Mica, 100pF, 500V	ELM	DM-15
C214	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
C215	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
C216	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
C217	A-5111	Capacitor	Ceramic trimmer, 9-35pF	ERI	538-011D9-35
C218	A-1028	Capacitor	Mica, 150pF, 500V	ELM	DM-15
C219	A-1126	Capacitor	Mica, 5pF, 500V	ELM	DM-15
C220	A-5111	Capacitor	Ceramic trimmer, 9-35pF	ERI	538-011D9-35
C221	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
C222	A-1126	Capacitor	Mica, 5pF, 500V	ELM	DM-15
C223	A-1217	Capacitor	Mica, 20pF, 500V	ELM	DM-15
C224	A-5208	Capacitor	Ceramic disc, .01 μ F, 100V	ERI	805-500-Z5V0-103Z
C225	A-5209	Capacitor	Ceramic disc, .001 μ F, 500V	ERI	801-012-X5F0-102K
L201	A-9818	Inductor	Molded, RF, 0.47 μ H	DEL	1025-12
L202	A-9817	Inductor	Molded, RF, 0.15 μ H	DEL	1025-00
or	A-9837	Inductor	Molded, RF, 0.1 μ H	DEL	1025-94
L203	A-9818	Inductor	Molded, RF, 0.47 μ H	DEL	1025-12
L204	A-3734	Inductor	0.25 μ H	JFD	LF4W025
L205	A-9818	Inductor	Molded, RF, 0.47 μ H	DEL	1025-12
L206	A-3733	Inductor	0.14 μ H	JFD	LF4W014
L207	A-9818	Inductor	Molded, RF, 0.47 μ H	DEL	1025-12
L208	A-9818	Inductor	Molded, RF, 0.47 μ H	DEL	1025-12
L209	A-9818	Inductor	Molded, RF, 0.47 μ H	DEL	1025-12
Q201	A-3102	Transistor	NPN, small signal, RF	RCA	2N918
Q202	A-3102	Transistor	NPN, small signal, RF	RCA	2N918
Q203	A-3238	Transistor	NPN, power, RF	COT	CD2418
R201	A-8557	Resistor	Comp., 1/4W, 5%, 2.2K	AB	CB
R202	A-8569	Resistor	Comp., 1/4W, 5%, 6.8K	AB	CB
R203	A-8541	Resistor	Comp., 1/4W, 5%, 470 Ω	AB	CB
R204	A-8508	Resistor	Comp., 1/4W, 5%, 20 Ω	AB	CB
R205	A-8521	Resistor	Comp., 1/4W, 5%, 68 Ω	AB	CB

Sym.	Aerocom Part No.	Part	Description	Mfrs.	
				Code*	P/N
R206	A-8508	Resistor	Comp., 1/4W, 5%, 20 Ω	AB	CB
R207	A-8559	Resistor	Comp., 1/4W, 5%, 2.7K	AB	CB
R208	A-8569	Resistor	Comp., 1/4W, 5%, 6.8K	AB	CB
R209	A-8541	Resistor	Comp., 1/4W, 5%, 470 Ω	AB	CB
R210	A-8508	Resistor	Comp., 1/4@, 5%, 20 Ω	AB	CB
R211	A-8521	Resistor	Comp., 1/4W, 5%, 68 Ω	AB	CB
R212	A-8508	Resistor	Comp., 1/4W, 5%, 20 Ω	AB	CB
R213	A-8531	Resistor	Comp., 1/4W, 5%, 180 Ω	AB	CB
R214	A-8547	Resistor	Comp., 1/4W, 5%, 820 Ω	AB	CB
R215	A-8505	Resistor	Comp., 1/4W, 5%, 15 Ω	AB	CB
R216	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB	CB
XQ201	A-2239	Socket	Teflon, TO-72	AUG	8060-1G4
XQ202	A-2239	Socket	Teflon, TO-72	AUG	8060-1G4
XY201	A-2231	Socket	Crystal, HC-25/U	AUG	8004-1G16
Y201	---	Crystal	See AEROCOM Dwg. XT-83		

Sym.	Aerocom Part No.	Part	Description	Mfrs.	
				Code*	P/N
C1	A-5173	Capacitor	Piston Trimmer, 2-25pF	VOL	TP-25
C2	A-1127	Capacitor	Mica, 10pF, 500V	ELM	DM-15
C3	A-1022	Capacitor	Mica, 62pF, 500V	ELM	DM-15
C4	A-1218	Capacitor	Ceramic disc, .01 μ F, 100V	RMC	TA-110
C5	A-1218	Capacitor	Ceramic disc, .01 μ F, 100V	RMC	TA-110
C6	A-1023	Capacitor	Mica, 100pF, 500V	ELM	DM-15
C7	A-1218	Capacitor	Ceramic disc, .01 μ F, 100V	RMC	TA-110
C8	A-2915	Capacitor	Electrolytic, 6.8 μ F, 35V	UCC	T368B685M035AS
D1	A-7350	Diode	Zener, 15V, 1W	UNI	1N4744
L1	A-520	Inductor	Ferrite, bead	FRX	K5-001-00/3B
Q1	A-7384	Transistor	Dual gate MOSFET	RCA	3N140
Q2	A-3204	Transistor	NPN, general purpose	NSC	2N2222
Q3	A-3204	Transistor	NPN, general purpose	NSC	2N2222
R1	A-8543	Resistor	Comp., 1/4W, 5%, 560 Ω	AB	CB
R2	A-8601	Resistor	Comp., 1/4W, 5%, 150K	AB	CB
R3	A-8535	Resistor	Comp., 1/4W, 5%, 270 Ω	AB	CB
R4	A-8565	Resistor	Comp., 1/4W, 5%, 4.7K	AB	CB
R5	A-8543	Resistor	Comp., 1/4W, 5%, 560 Ω	AB	CB
R6	A-8541	Resistor	Comp., 1/4W, 5%, 470 Ω	AB	CB
R7	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB	CB
R8	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB	CB
R9	A-8541	Resistor	Comp., 1/4W, 5%, 470 Ω	AB	CB
R10	A-8549	Resistor	Comp., 1/4W, 5%, 1K	AB	CB
XQ1	A-2239	Socket	Transistor, TO-72	AUG	8060-1G4
XQ2	A-2238	Socket	Transistor, TO-18	AUG	8060-1G3
XQ3	A-2238	Socket	Transistor, TO-18	AUG	8060-1G3
XY1	A-2253	Socket	Crystal, HC-6/U	AUG	8000-DG1
Y1		Crystal	Per dwg. XT-27	SAV	

Sym.	Aerocom Part No.	Part	Description	Mfrs.	
				Code*	P/N
C1	A-5205	Capacitor	Piston Trimmer, 1-6pF	VOL	TP-6
C2	A-1027	Capacitor	Mica, 8 pF, 500V	ELM	DM-15
C3	A-1206	Capacitor	Mica, 680pF, 500V	ELM	DM-15
C4	A-1218	Capacitor	Ceramic disc, .01μF, 100V	RMC	TA-110
C5	A-1218	Capacitor	Ceramic disc, .01μF, 100V	RMC	TA-110
C6	A-1127	Capacitor	Mica, 10pF, 500V	ELM	DM-15
C7	A-1218	Capacitor	Ceramic disc, .01μF, 100V	RMC	TA-110
C8	A-2915	Capacitor	Electrolytic, 6.8 μF, 35V	UCC	T368B685M035AS
C9	A-1084	Capacitor	Mica, 75 pF, 500V	ELM	DM-15
C10	A-1023	Capacitor	Mica, 100pF, 500V	ELM	DM-15
D1	A-7350	Diode	Zener, 15V, 1W	UNI	1N4744
D2	A-7452	Diode	Varactor	MOT	MV3102
L1	A-520	Inductor	Ferrite, bead	FRX	K5-001-00/3B
L2	A-9829	Inductor	Molded, 100μH	DEL	1025-68
Q1	A-7384	Transistor	Dual gate MOSFET	RCA	3N140
Q2	A-3204	Transistor	NPN, general purpose	NSC	2N2222
Q3	A-3204	Transistor	NPN, general purpose	NSC	2N2222
R1	A-8545	Resistor	Comp., 1/4W, 5%, 820Ω	AB	CB
R2	A-8601	Resistor	Comp., 1/4W, 5%, 150K	AB	CB
R3	A-8535	Resistor	Comp., 1/4W, 5%, 270Ω	AB	CB
R4	A-8565	Resistor	Comp., 1/4W, 5%, 4.7K	AB	CB
R5	A-8557	Resistor	Comp., 1/4W, 5%, 2.2K	AB	CB
R6	A-8541	Resistor	Comp., 1/4W, 5%, 470Ω	AB	CB
R7	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB	CB
R8	A-8573	Resistor	Comp., 1/4W, 5%, 10K	AB	CB
R9	A-8525	Resistor	Comp., 1/4W, 5%, 100Ω	AB	CB
R10	A-8549	Resistor	Comp., 1/4W, 5%, 1K	AB	CB
R11	A-8605	Resistor	Comp., 1/4W, 5%, 220K	AB	CB
XQ1	A-2239	Socket	Transistor, TO-72	AUG	8060-1G4
XQ2	A-2238	Socket	Transistor, TO-18	AUG	8060-1G3
XQ3	A-2238	Socket	Transistor, TO-18	AUG	8060-1G3
XY1	A-2253	Socket	Crystal, HC-6/U	AUG	8000-DG1
Y1	A-5095	Crystal	1750 kHz, per dwg. XT-62	SAV	

*Or equal

Cor. 6/75

.. 1750kHz OSCILLATOR AR-1054

PARTS LIST

Page 39

10.6 Manufacturers' Abbreviations

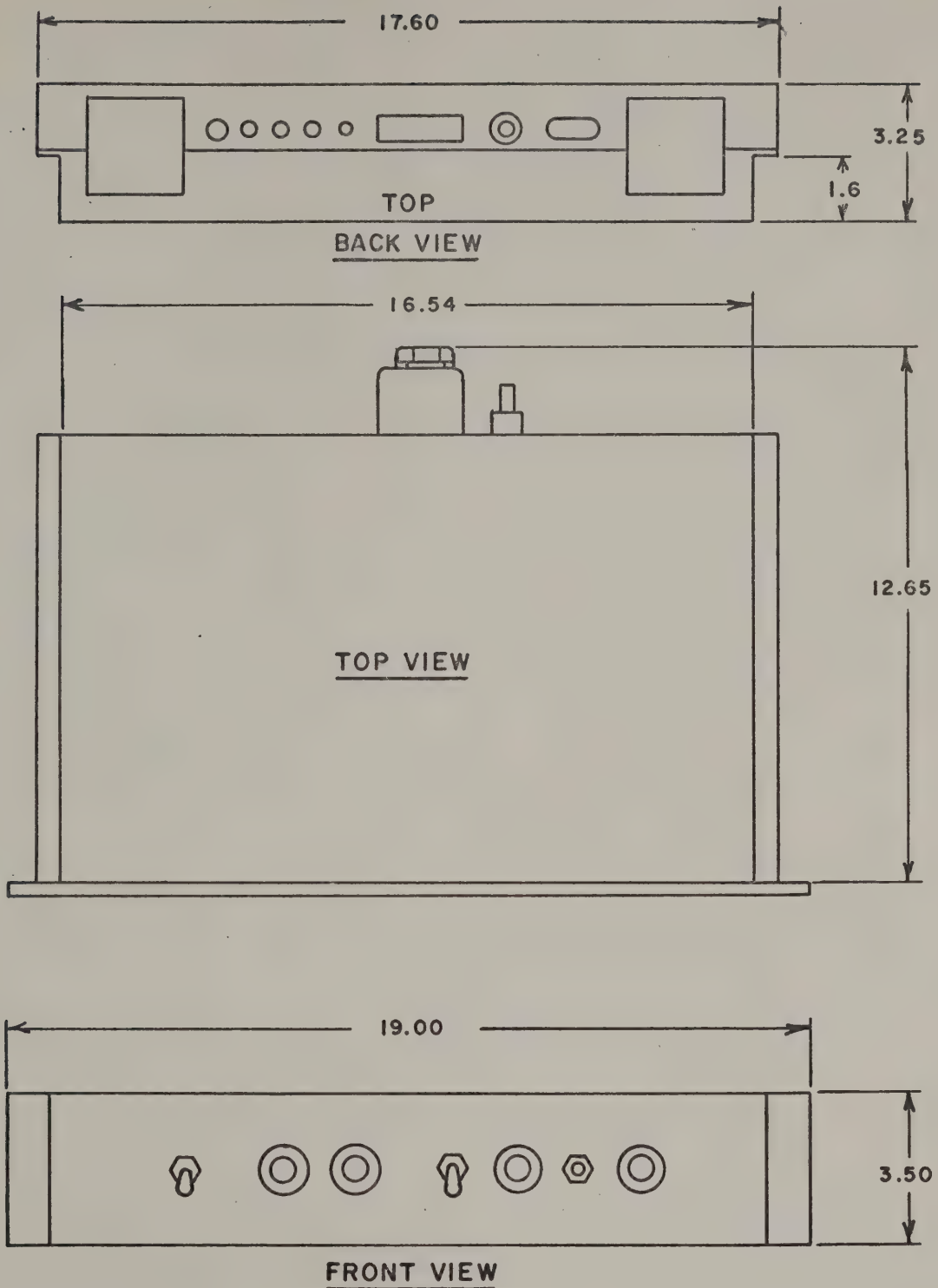
AB ALLEN BRADLEY CO., MILWAUKEE, WISCONSIN
AER AERONAUTICAL COMMUNICATIONS EQUIPMENT, INC., MIAMI, FLORIDA
ALL ALLIED CONTROLS CO., INC., NEW YORK, NEW YORK
AMP AMPHENOL-BORG ELECTRONICS CORP., BROADVIEW, ILLINOIS
AUG AUGAT BROTHERS, INC., ATTLEBORO, MASSACHUSETTS
BEC BECKMAN INSTRUMENTS, INC., FULLERTON, CALIFORNIA
BUS BUSSMAN MANUFACTURING CO., ST. LOUIS, MO.

CEI CARLING ELECTRIC, INC., W. HARTFORD, CONN.
CRL CENTRALAB, A DIV. OF GLOBE-UNION, INC., MILWAUKEE, WISCONSIN
CWC CONTINENTAL WIRT ELECTRIC CORP., WARRENSTER, PA.
DEL DELAVAN ELECTRONICS CORP., EAST AURORA, NEW YORK
ERI ERIE ELECTRONICS, ERIE, PENNSYLVANIA
ELM ELECTRO MOTIVE MANUFACTURING CO., INC., WILLIMANTIC, CONNECTICUT
FCD FAIRCHILD SEMICONDUCTOR, MT. VIEW, CALIF.

GE GENERAL ELECTRIC CORP., CLIFTON, NEW JERSEY
MIL J.W. MILLER COMPANY, LOS ANGELES, CALIFORNIA
MON MONSANTO ELECTRONIC SPECIAL PRODUCTS, CUPERTINO, CALIF.
MOT MOTOROLA, INC., CHICAGO, ILLINOIS
NSC NATIONAL SEMICONDUCTOR CORP., SANTA CLARA, CALIFORNIA
PAM AMERICAN PAMCOR, INC., VALLEY FORGE, PENNSYLVANIA
PTI PIEZO TECHNOLOGY, INC., ORLANDO, FLORIDA

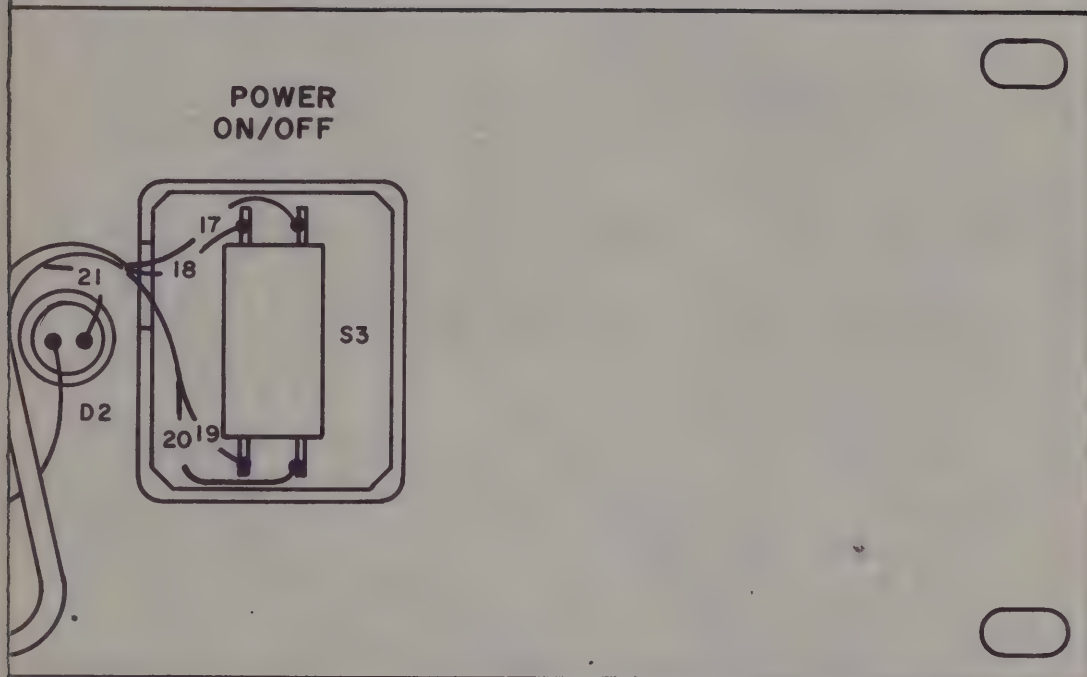
RCA RADIO CORPORATION OF AMERICA, JERSEY CITY, NEW JERSEY
RMC RADIO MATERIAL CORP., CHICAGO, ILLINOIS
SIG SIGMA INSTRUMENTS, INC., S. BRAINTREE, MASS.
SIL SILICONIX, INC., SANTA CLARA, CALIFORNIA
SPR SPRAGUE ELECTRIC CO., N. ADAMS, MASS.
STN STANCOR ELECTRONICS, INC., CHICAGO, ILLINOIS
SW SWITCHCRAFT CORP., CHICAGO, ILL.

TI TEXAS INSTRUMENTS, INC., DALLAS, TEXAS
TRN TRANSITRON ELECTRONIC CORP., WAKEFIELD, MASS.
TTI TRANSFORMER TECHNICIANS, INC., CHICAGO, ILL.
UCC UNITED CARBIDE CORP., ELECTRONICS DIV., COMPONENTS DEPT., GREENVILLE, S.C.
VOL VOLTRONICS CORP., HANOVER, N.J.
WAT WATKINS-JOHNSON COMPANY, PALO ALTO, CALIFORNIA



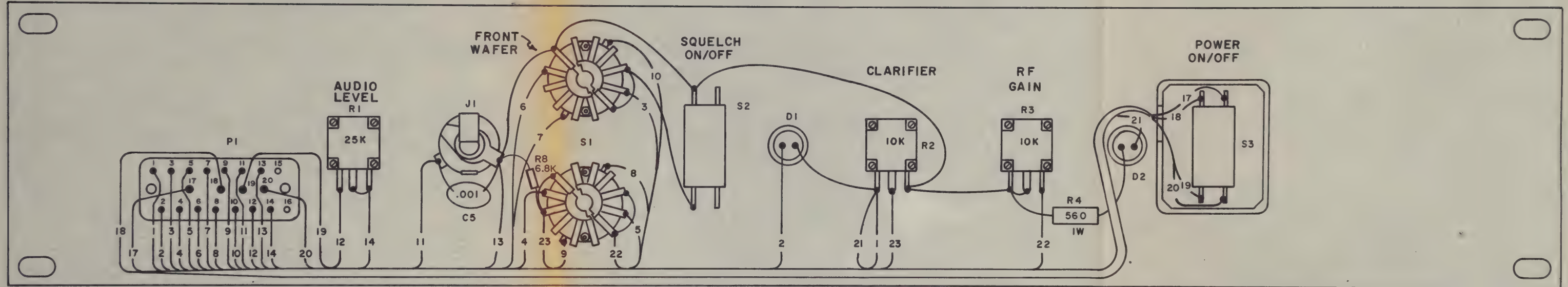
NOTE: ALL DIMENSIONS ARE IN INCHES.

**AEROCOM 2210
HF AM/SSB RECEIVER
OUTLINE DIMENSIONS**



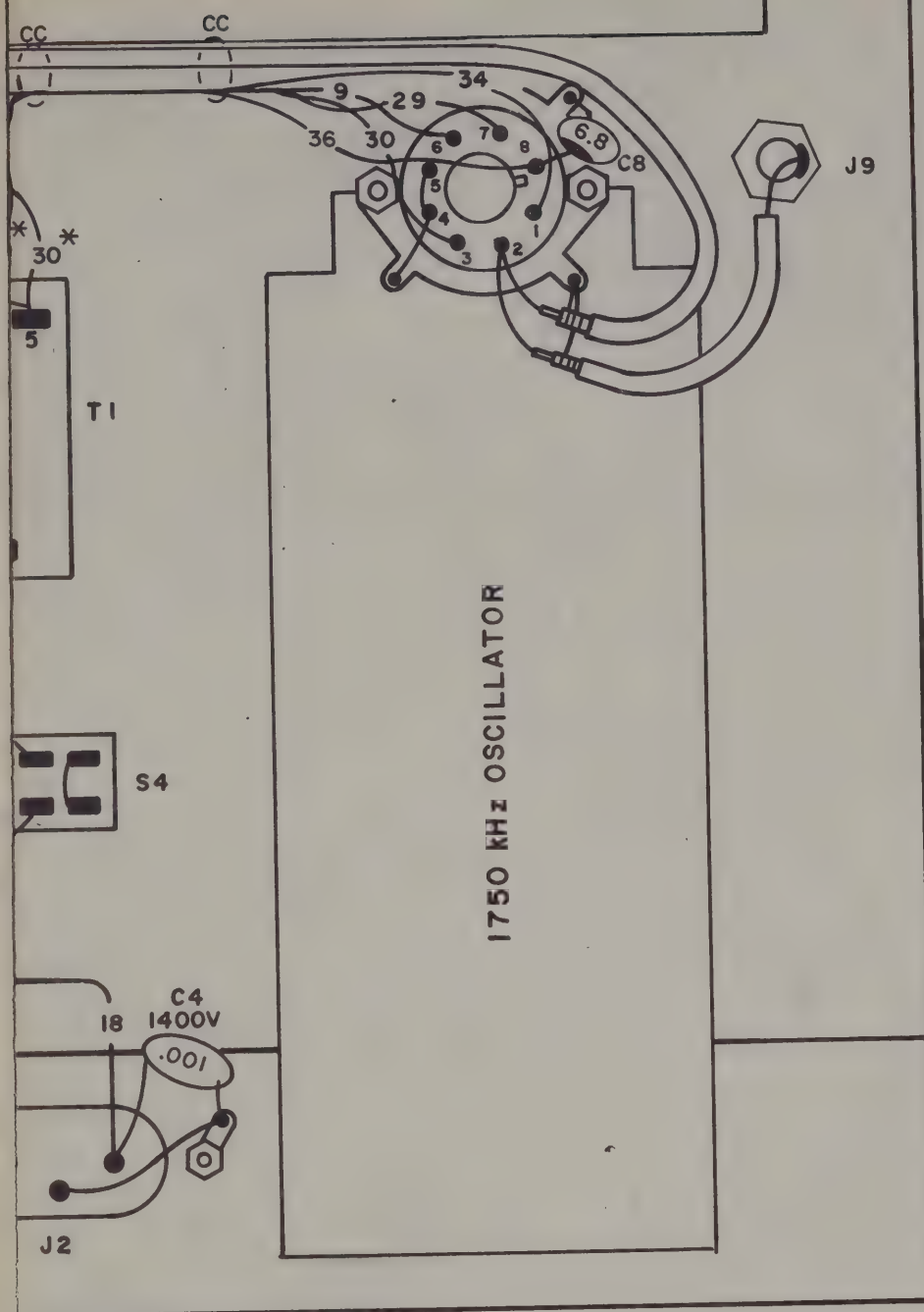
**AEROCOM 2210 RECEIVER
FRONT PANEL
WIRING**

TOP

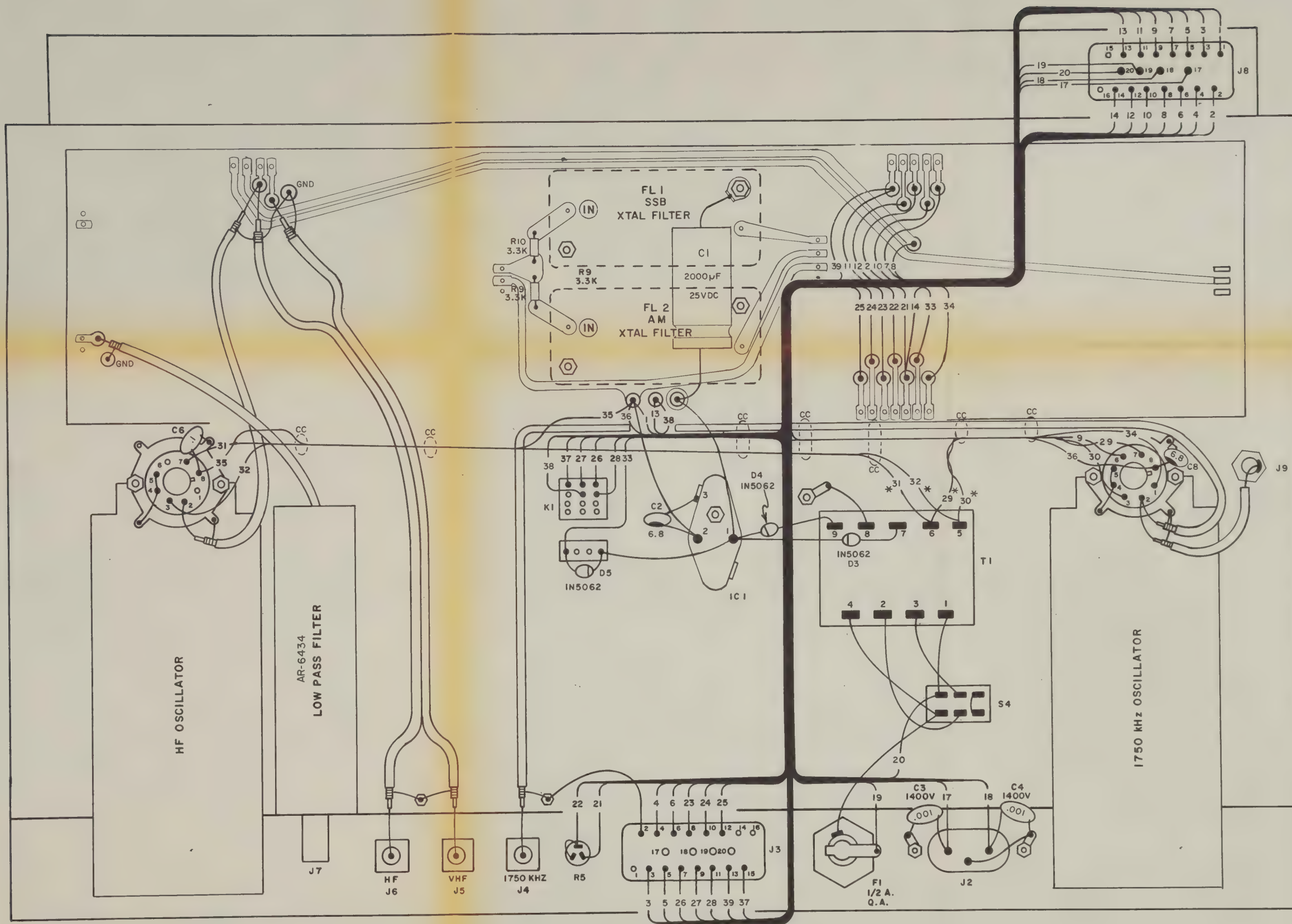


REAR VIEW

**AEROCOM 2210 RECEIVER
FRONT PANEL
WIRING**

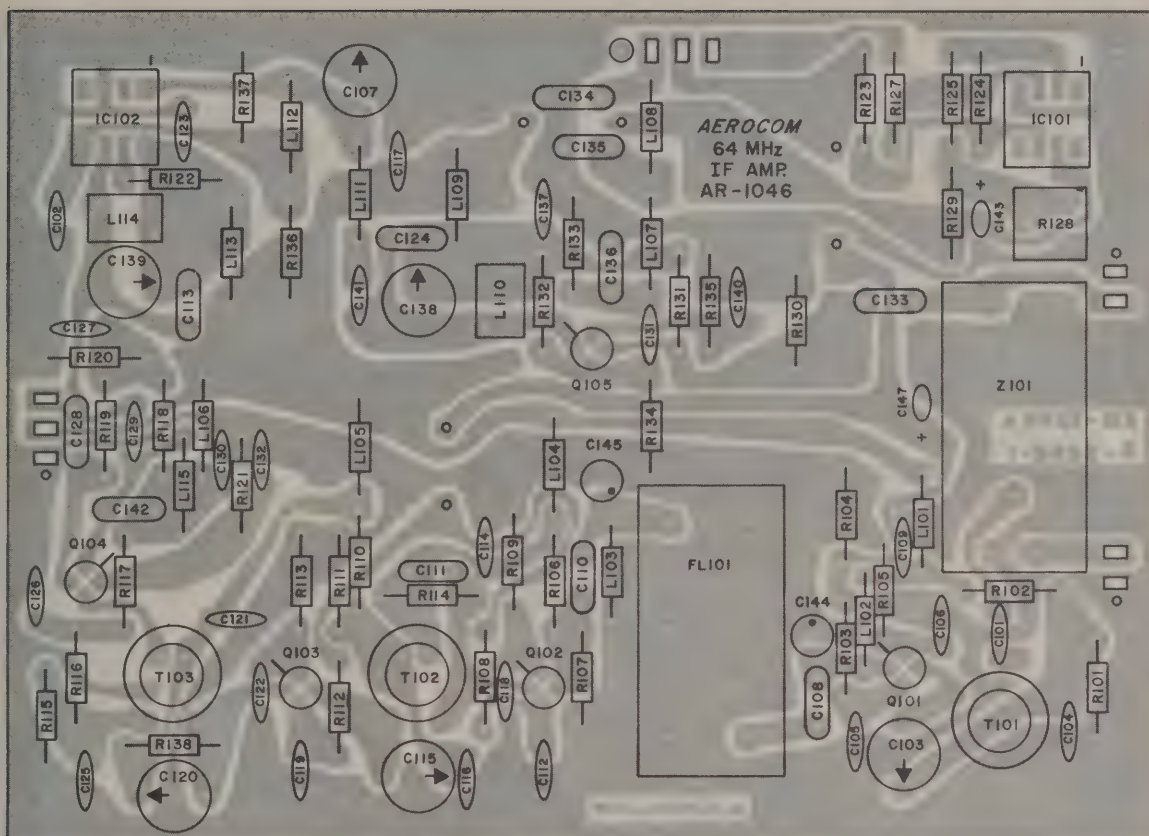


AEROCOM 2210 RECEIVER MAIN CHASSIS WIRING

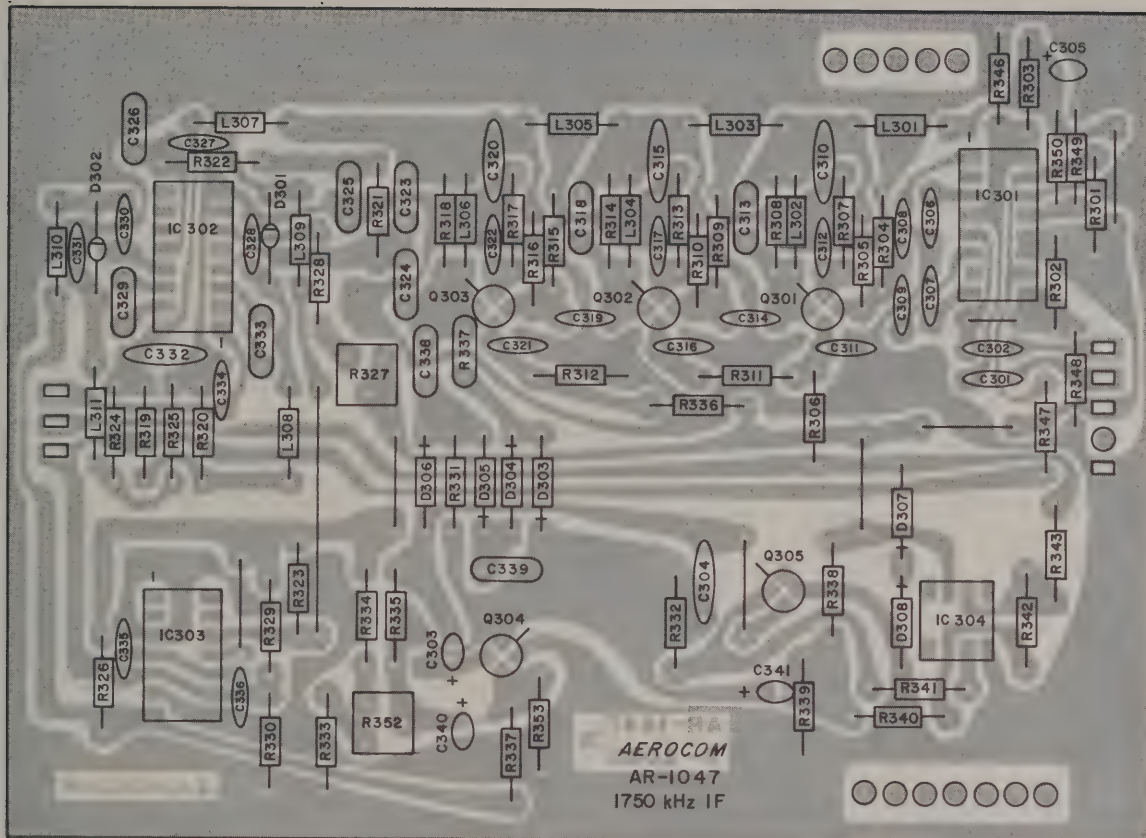


NOTE:
 * WIRE N°S 29,30 AND 31,32 ARE TWISTED PAIRS.
 CC INDICATES CABLE CLAMP.

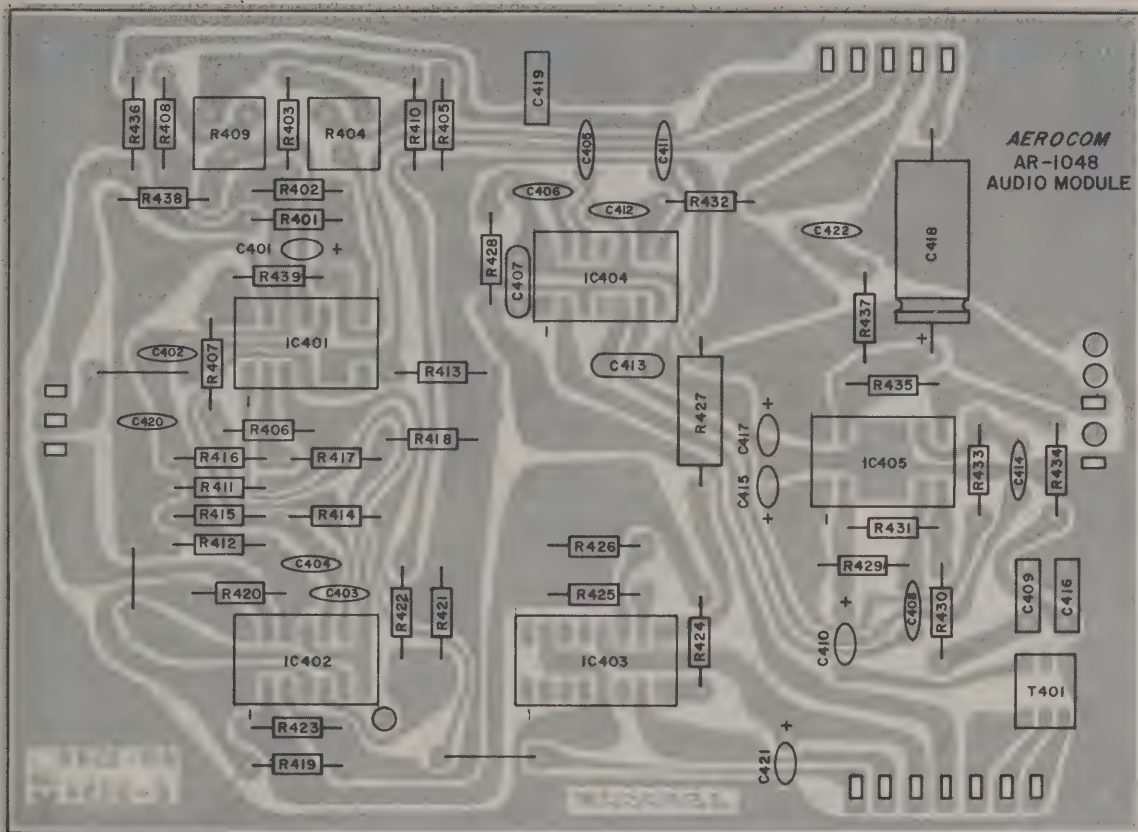
AEROCOM 2210 RECEIVER
MAIN CHASSIS
WIRING



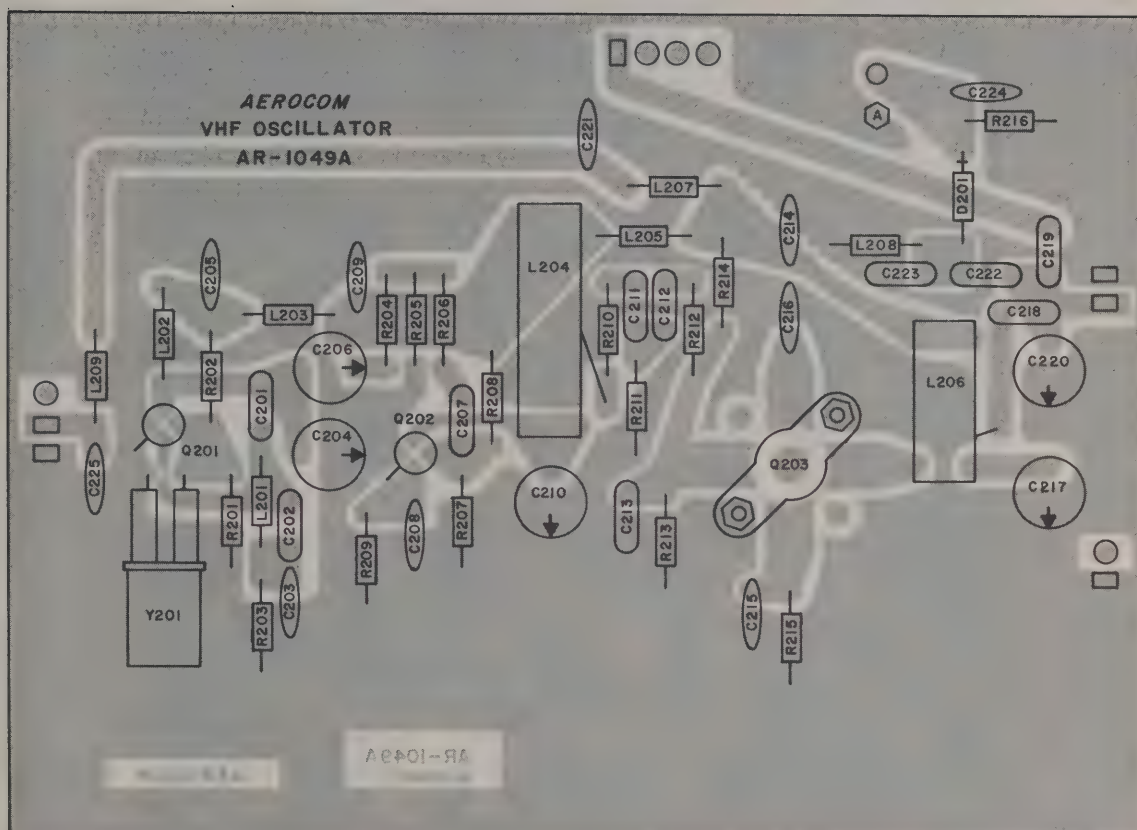
64 MHz IF MODULE AR-1046A
SEE-THRU VIEW



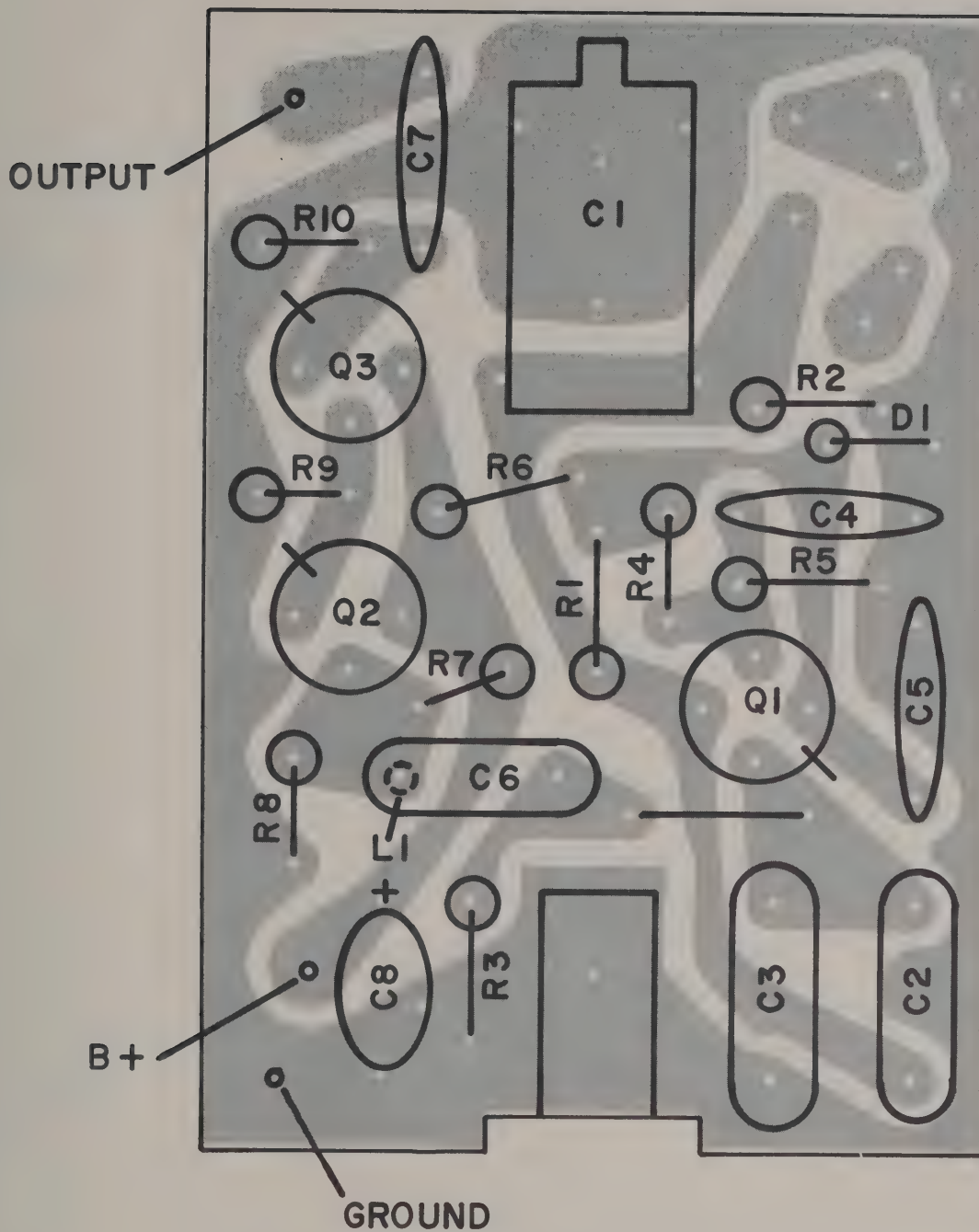
1750 kHz IF MODULE AR-1047
SEE-THRU VIEW



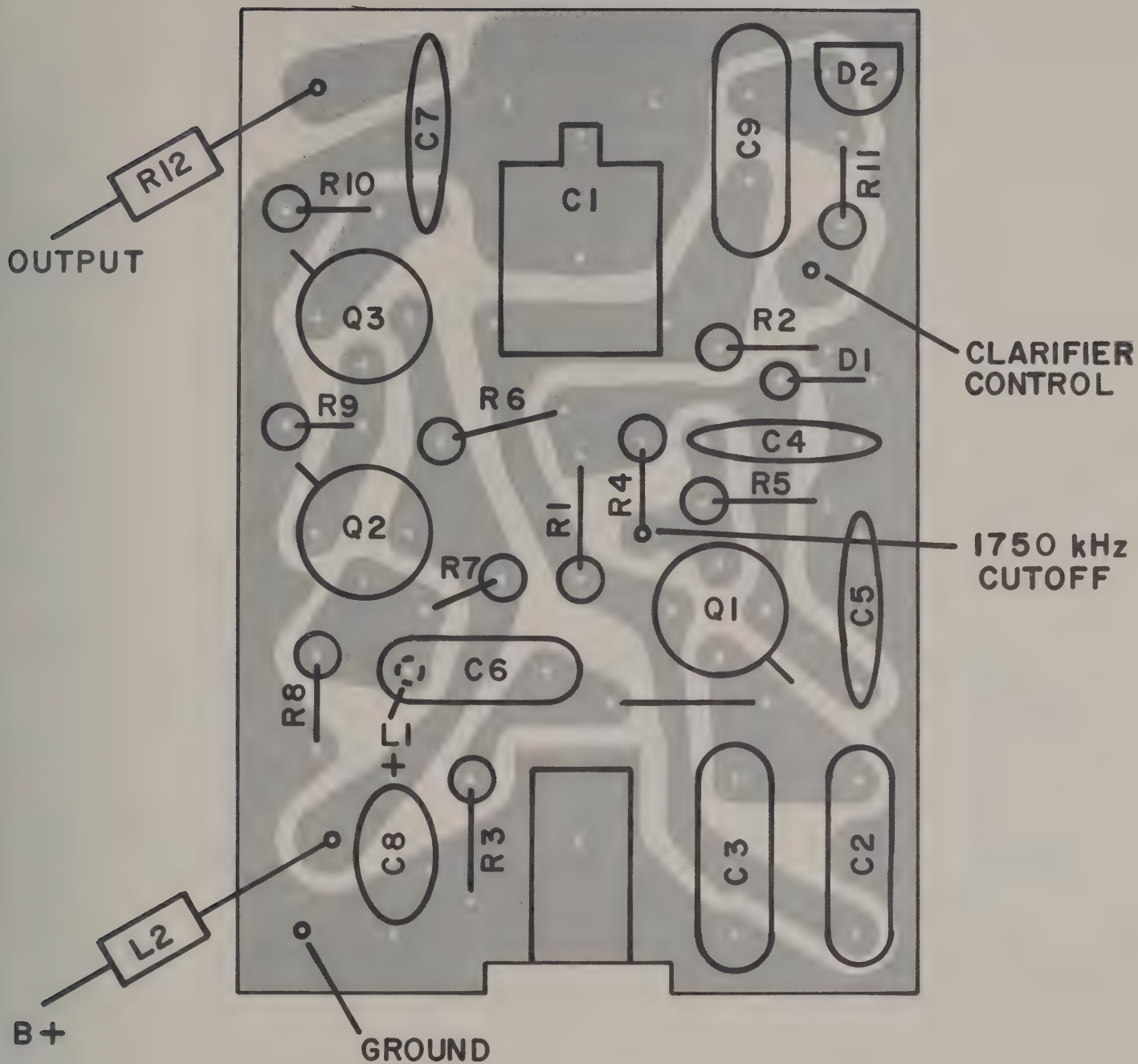
AUDIO MODULE AR-1048
SEE-THRU VIEW



VHF OSCILLATOR MODULE AR-1049A
SEE-THRU VIEW



HF OSCILLATOR AR-1050
 SEE-THRU VIEW



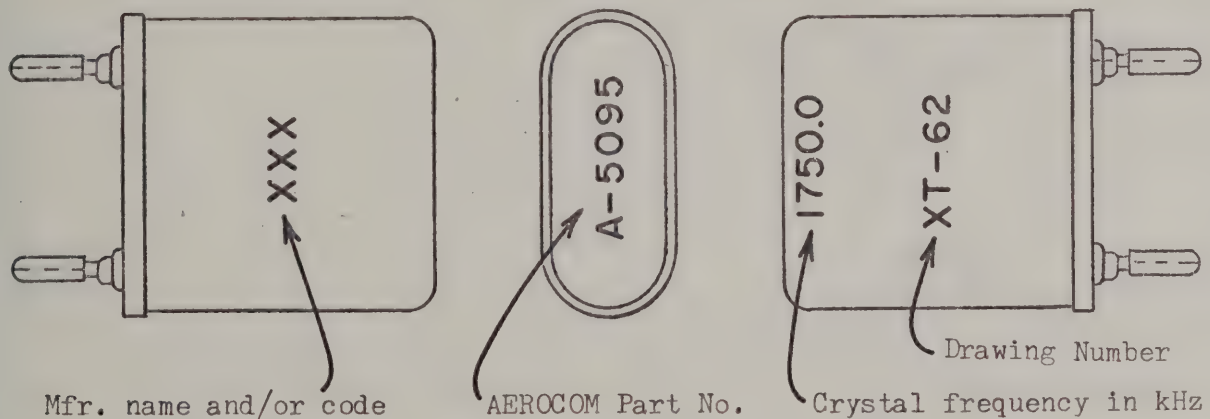
1750 kHz OSCILLATOR AR-1054
SEE-THRU VIEW

HF CRYSTAL SPECIFICATIONS

Except as otherwise specified, all characteristics are

1. To be in accordance with CR-62A/U specifications.
2. A cold weld type holder shall be used.
3. Use gold plating or best method.
4. Use fundamental frequency.
5. Supply a "temperature/frequency change" chart for each crystal, covering the minimum range of 65°C to 85°C.
6. Can marking (see drawing below):
 - A. Stamp Aerocom part number on top of can.
 - B. Stamp CRYSTAL frequency on side of can.
 - C. Stamp "XT-62" on side of can.
 - D. Stamp Mfr. code number on side of can.
7. Apply accelerated aging temperature cycling.
8. Maximum series resistance of 80 ohm at 1 mW drive level.
9. Motional Capacitance shall be greater than .0095 pF.

NOTE: Crystal frequency equals 1750.000 kHz.



This crystal is used in the following AEROCOM equipment:

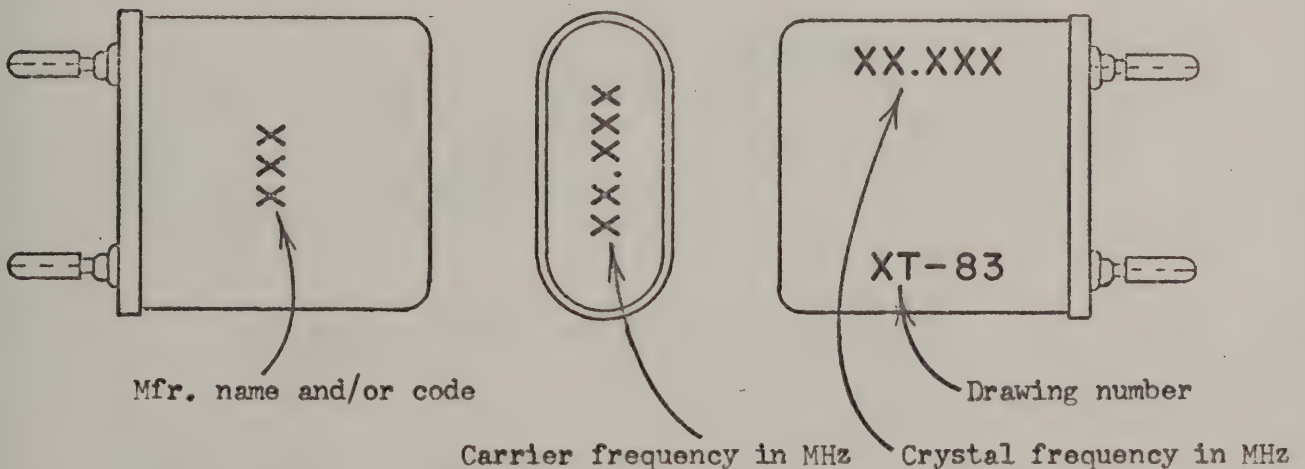
1. 2210

-3 Add Specification No. 9 2/5/75 MAC
 -2 Add Specification No. 8, 11/22/74 MAC
 -1 Corrected can marking 11/13/74 MAC

DESIGN	NAME	DATE	HF CRYSTAL SPECIFICATIONS FOR AEROCOM PART No. A-5095	DWG. No.
DRAWN	DJK	7-15-74		XT-62-3
CHECKED	JG	2-4-75		SCALE
APPROVED			AEROCOM. AERONAUTICAL COMMUNICATIONS EQUIPMENT, INCORPORATED ■ 3090 SOUTHWEST 37th AVENUE • MIAMI • FLORIDA 33133	

VHF CRYSTAL SPECIFICATIONS

1. Except as otherwise specified, all characteristics are to be in accordance with CR-83/U specifications.
2. A cold weld type of holder shall be used.
3. Crystal shall be heat cycled (preaged).
4. The frequency shall be within .001% at room temperature and not exceed an additional .001% over temperature excursions of 0°C to 50°C.
5. Supply frequency vs. temperature curve over the temperature range of 0°C to 50°C.
6. Can markings (see drawing below):
 - (a) Stamp carrier frequency on top of can.
 - (b) Stamp crystal frequency on side of can.
 - (c) Stamp "XT-83" on side of can.
 - (d) Stamp Mfr. code on side of can.

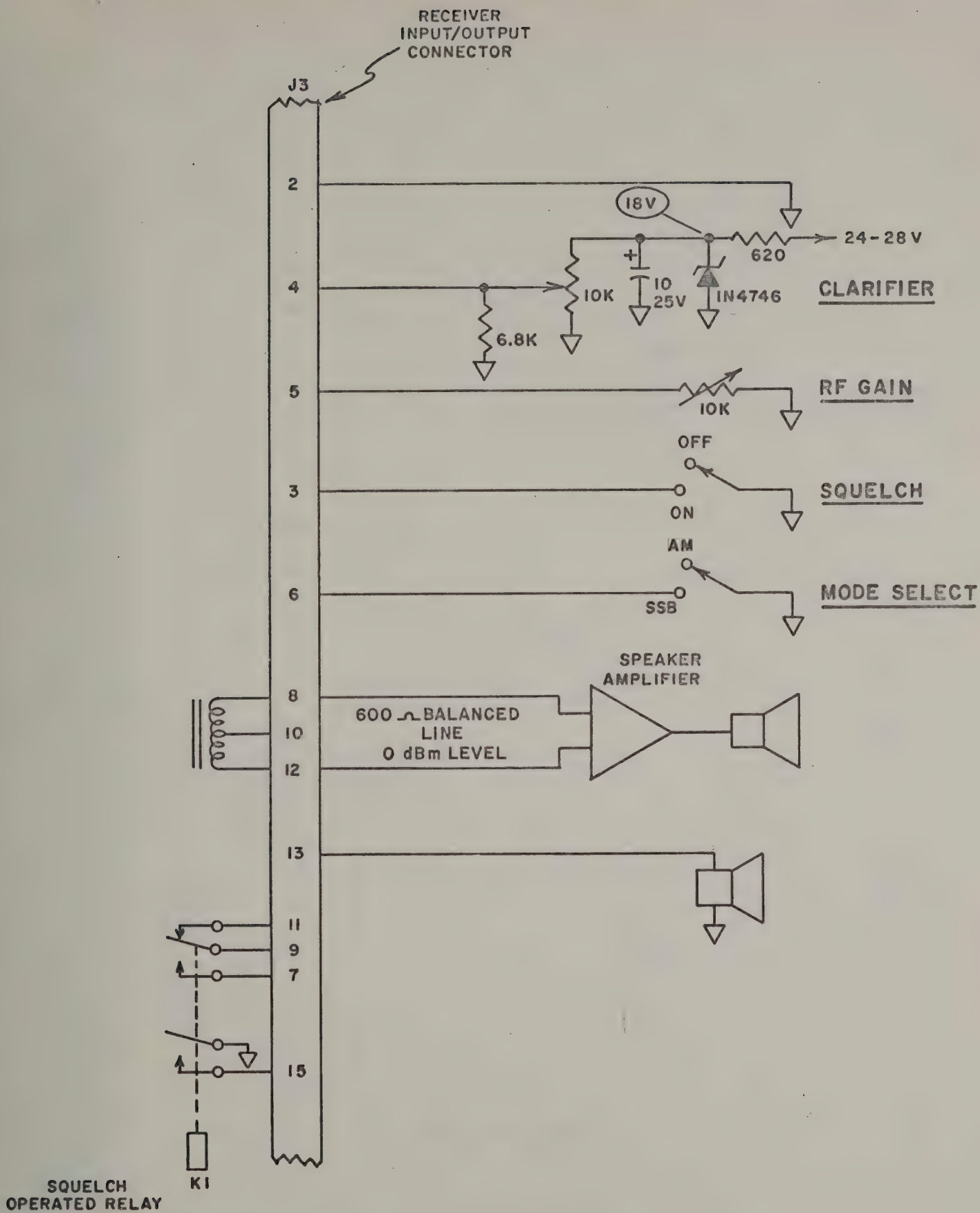


This crystal is used in the following AEROCOM equipments:

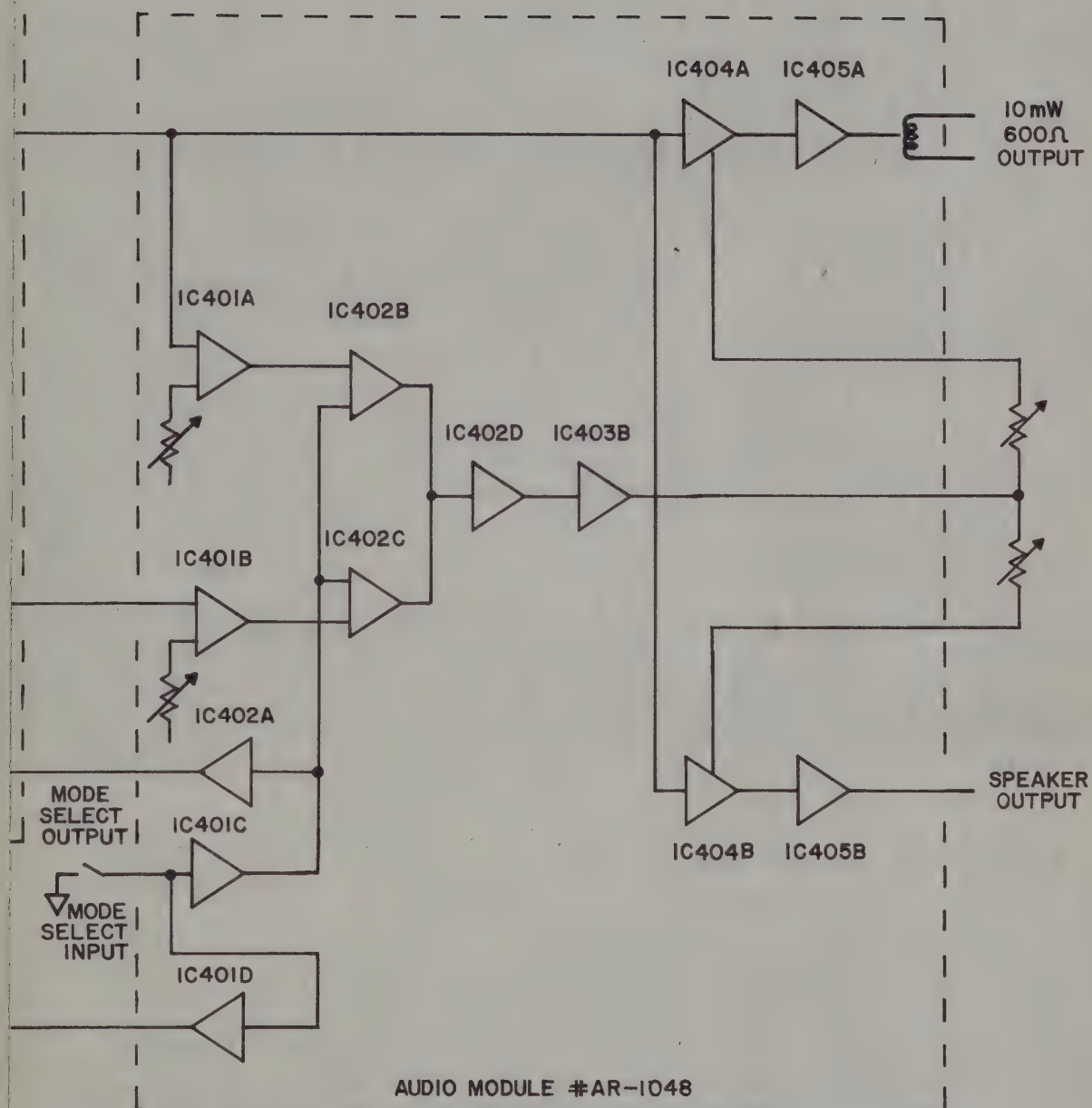
1. 7070
Crystal frequency equals 1/2 carrier frequency.
2. 2210
Crystal frequency equals carrier frequency plus 64 MHz.

This drawing supersedes drawing numbered X-516 & A-7681

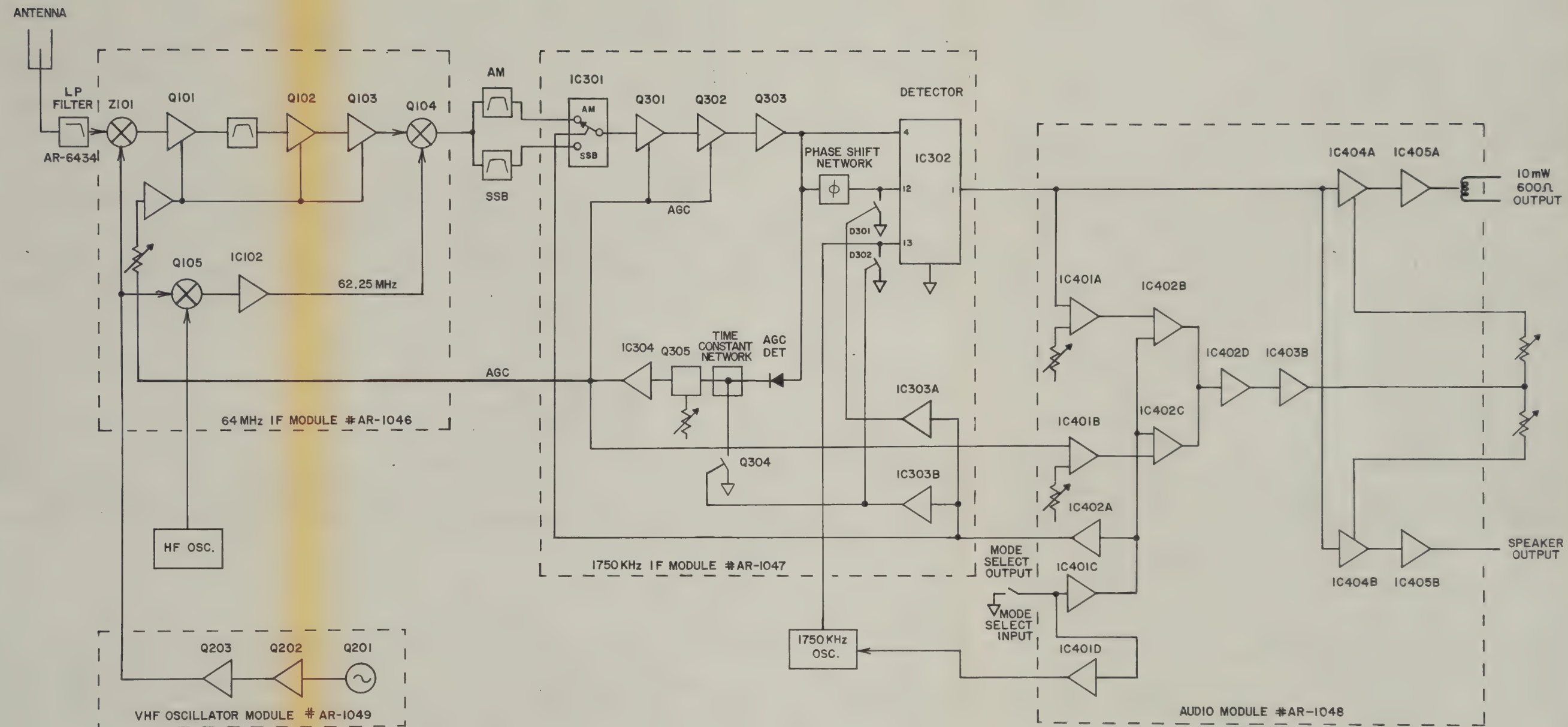
DESIGN	NAME	DATE	VHF Crystal Specifications	DWG. No.
DRAWN				XT-83
CHECKED	Mac	9-11 '73		SCALE
APPROVED			AEROCOM.	AERONAUTICAL COMMUNICATIONS EQUIPMENT, INCORPORATED ■ 3090 SOUTHWEST 37th AVENUE • MIAMI • FLORIDA 33133



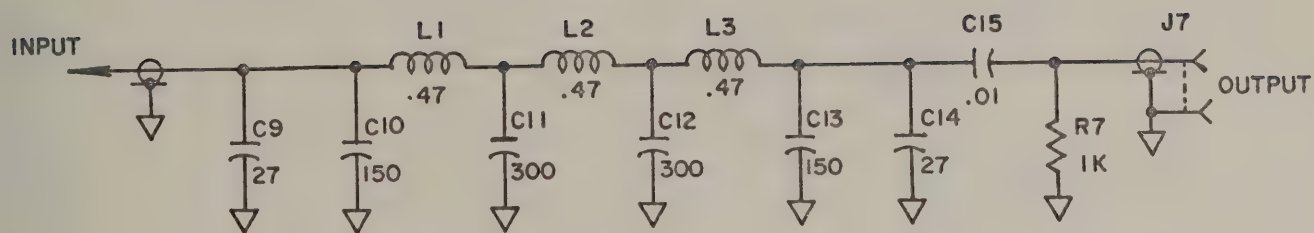
**AEROCOM 2210 RECEIVER
REMOTE CONTROL CIRCUIT**



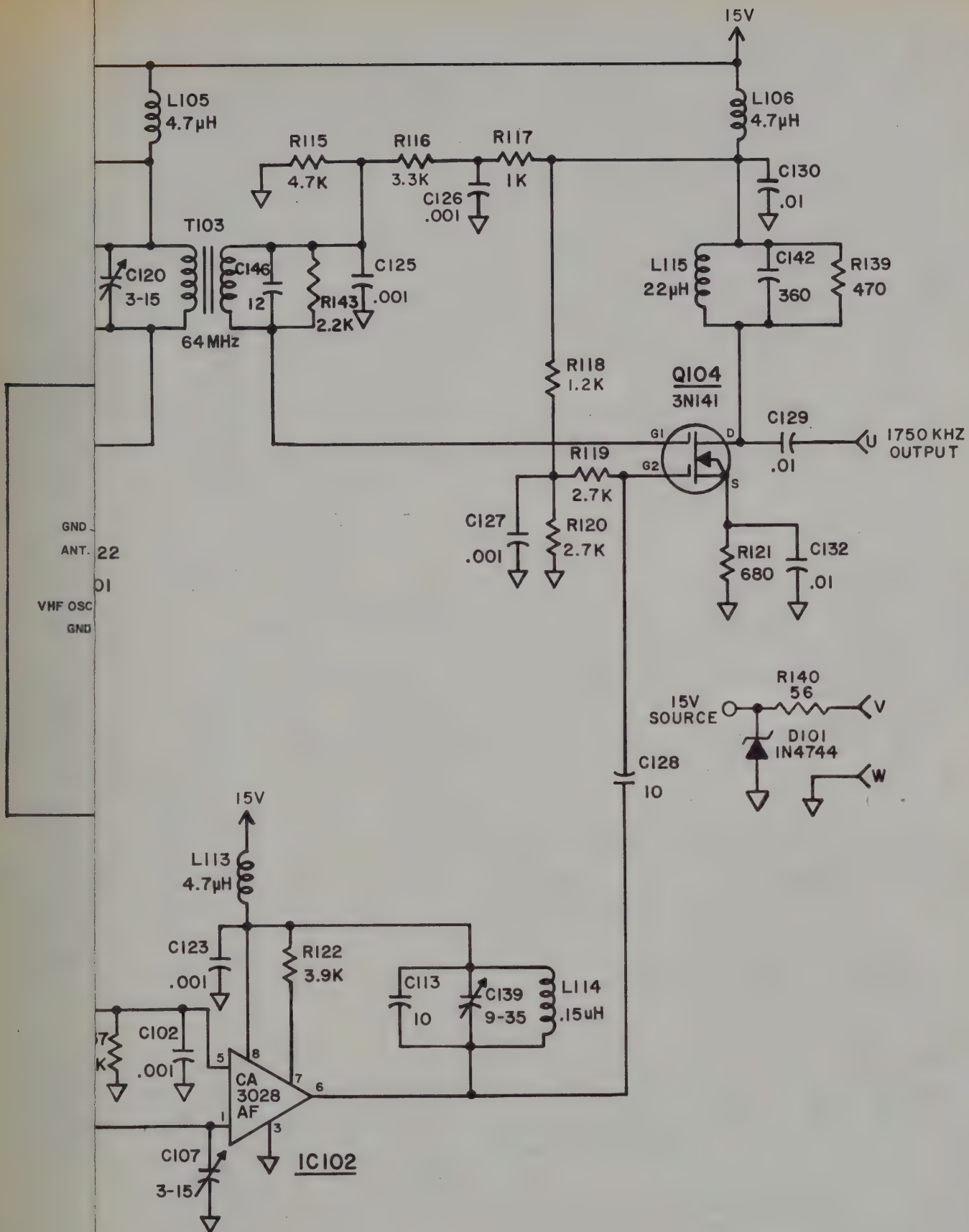
AEROCOM 2210
HF AM/SSB RECEIVER
BLOCK DIAGRAM



AEROCOM 2210
HF AM/SSB RECEIVER
BLOCK DIAGRAM

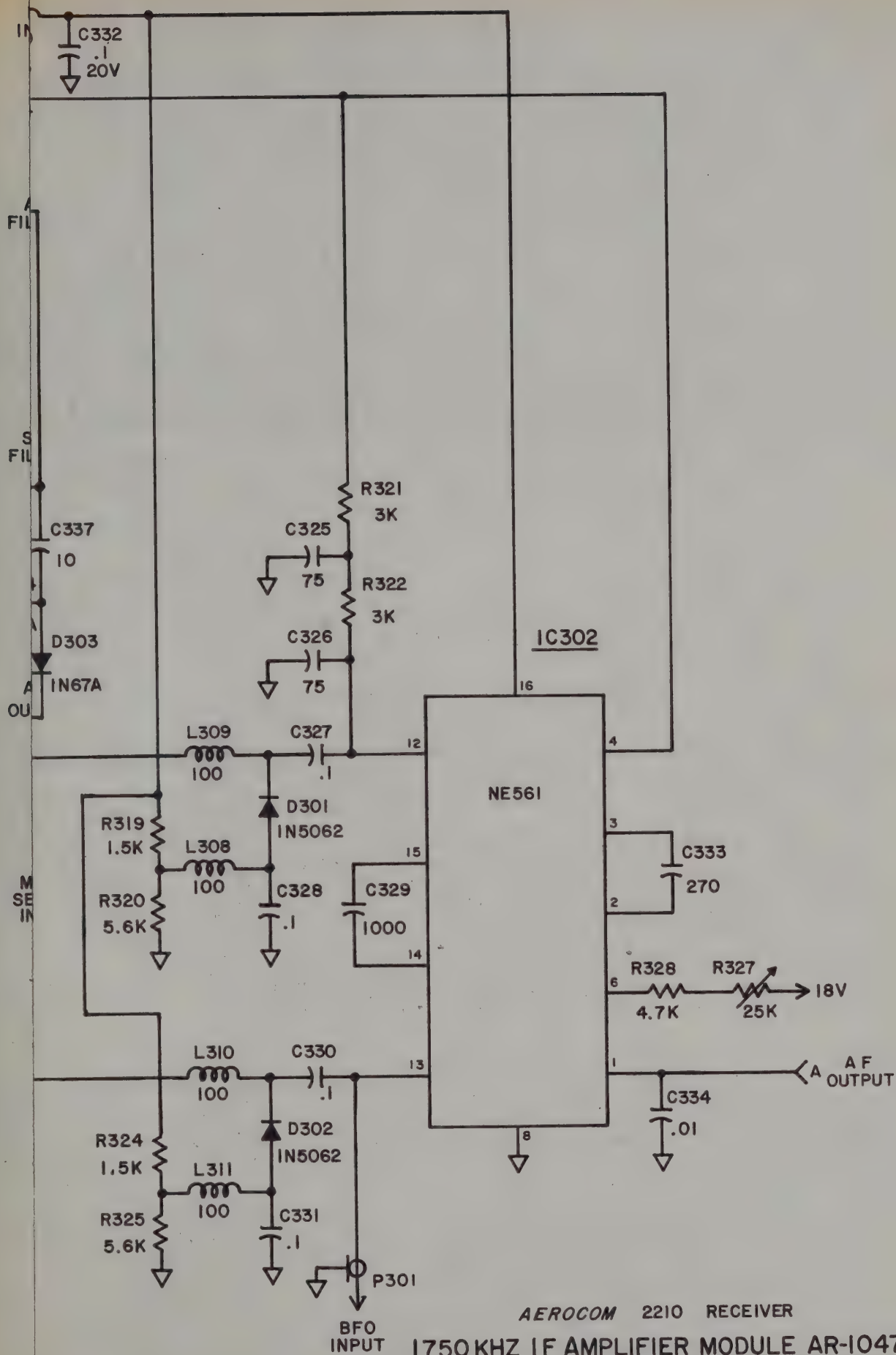


AEROCOM 2210 RECEIVER
 LOW PASS FILTER AR-6434
 SCHEMATIC



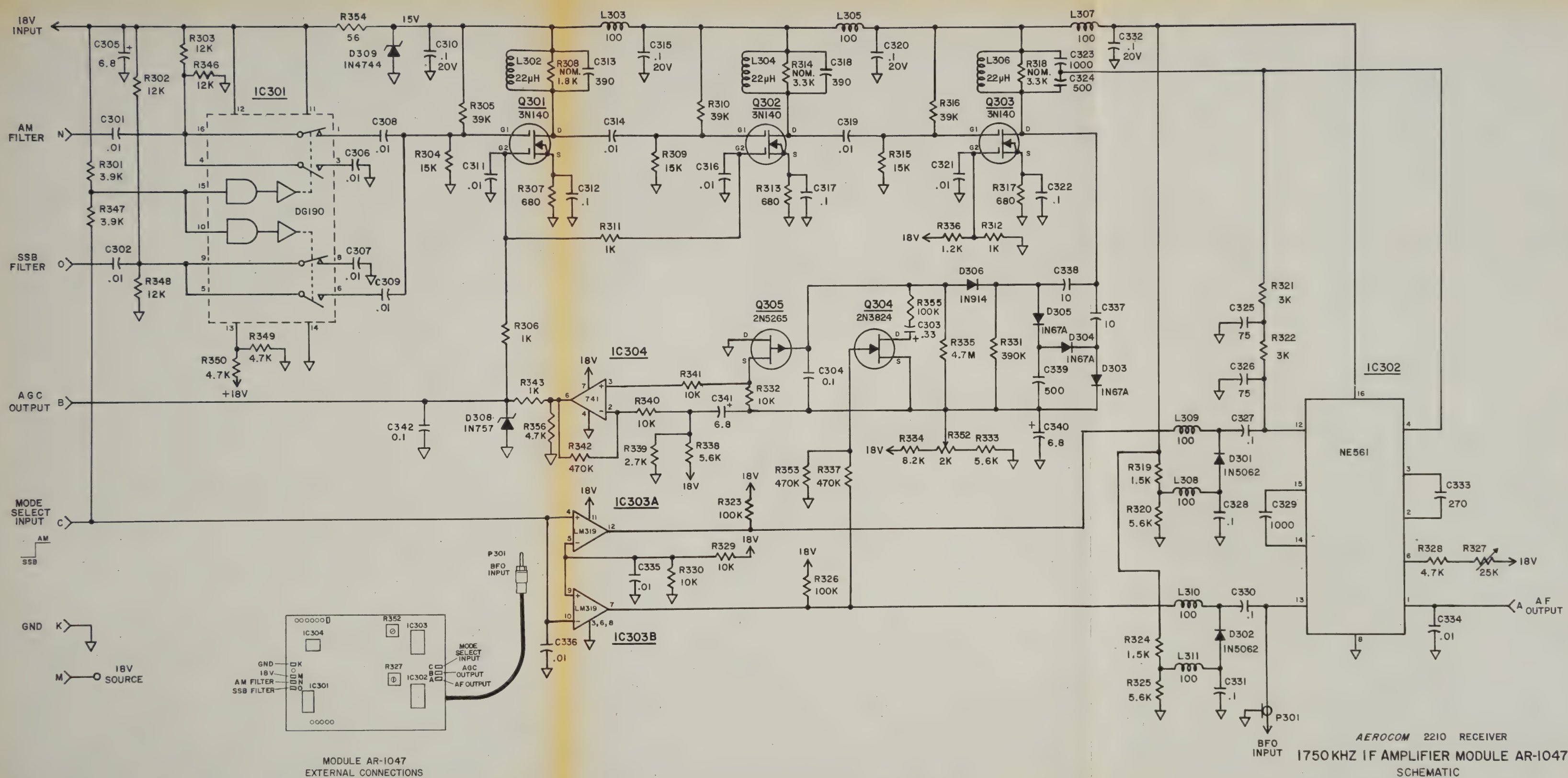
AEROCOM 2210 RECEIVER
64 MHz IF AMPLIFIER MODULE AR-1046A
SCHEMATIC

-2 SHOW R308, R314, R318 AS "NOMINAL" 10-1-72 DJK/JP
 -3 CORRECTED FOR S/N 237, 240 UP (MODIF. A) 13 FEB 76 DJK/RW



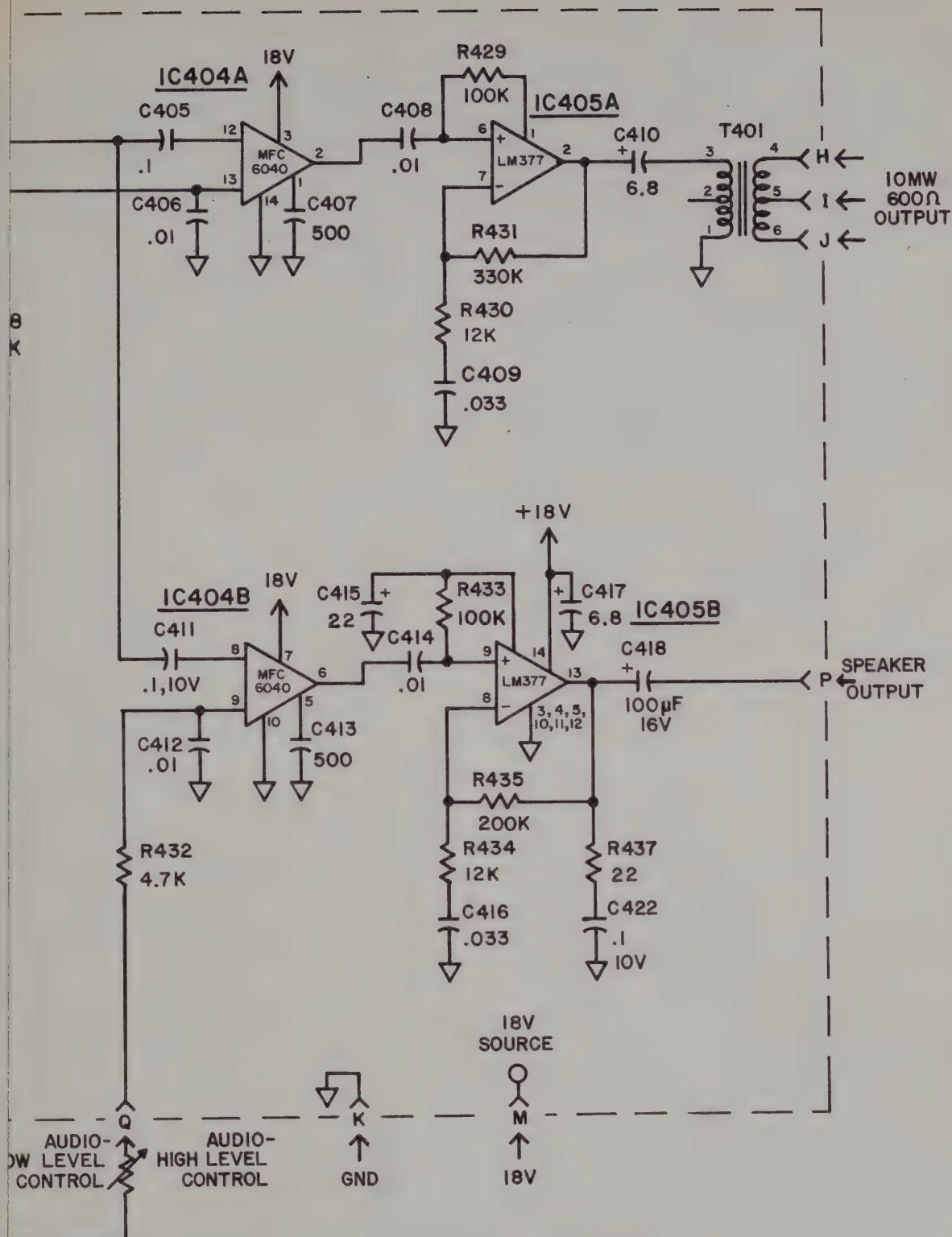
AEROCOM 2210 RECEIVER
 1750 KHZ IF AMPLIFIER MODULE AR-1047
 SCHEMATIC

-1 CORRECTED FOR S/N 119 UP 5MART5 LTM
-2 SHOW R308, R314, R318 AS "NOMINAL"
-3 CORRECTED FOR S/N 237, 240 UP (MODIF. A) 13 FEB 76 DJK/RW

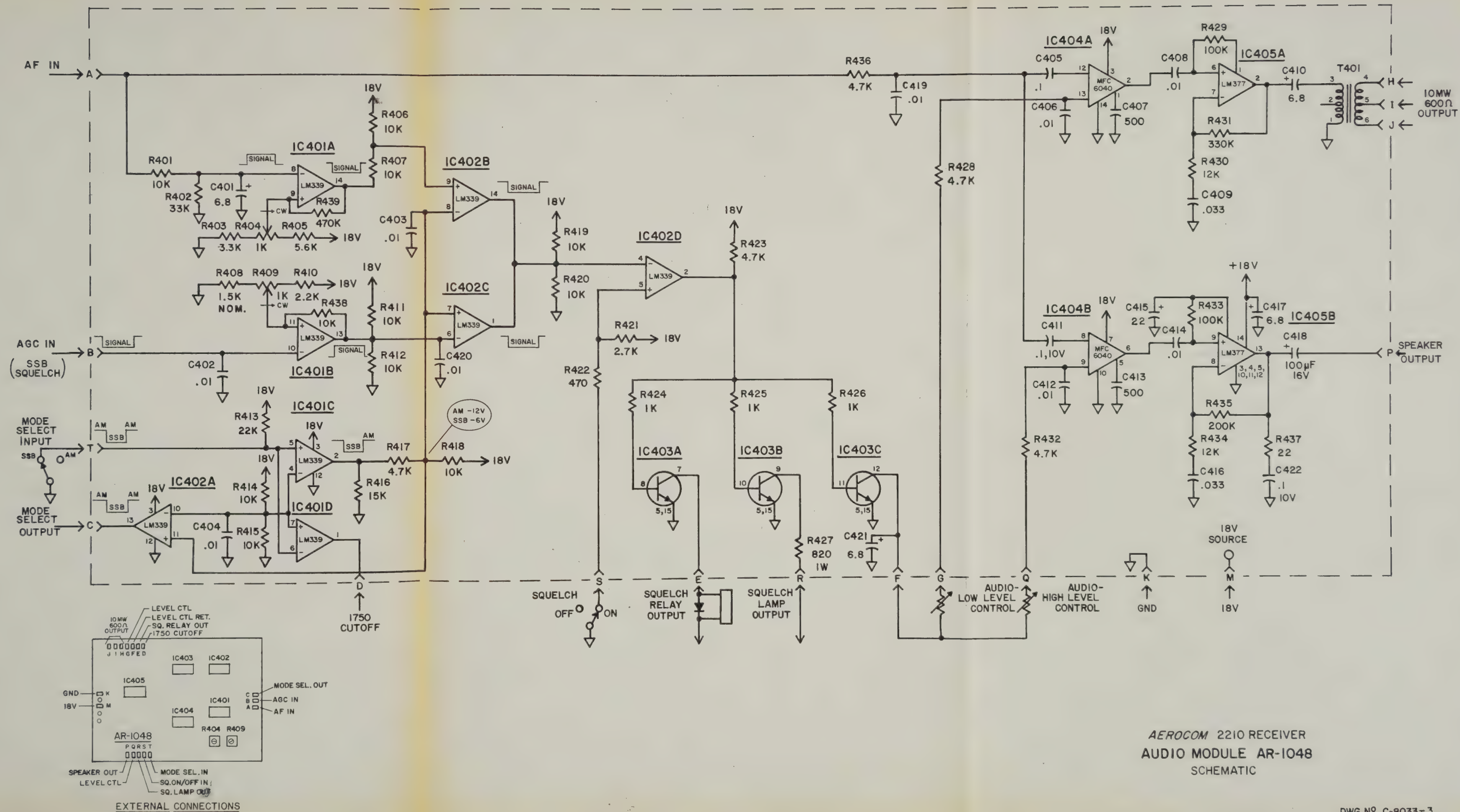


AEROCOM 2210 RECEIVER
1750 KHZ IF AMPLIFIER MODULE AR-1047
SCHEMATIC

-1 CORRECTED FOR S/N 119 AND UP 5MAR75 LTM
 -2 SHOW R408 AS "NOMINAL" 10-1-75 DJK/JP
 -3 CORRECTED FOR S/N 237, 240 UP (MODIFA) 12 FEB 76 DJK/RW

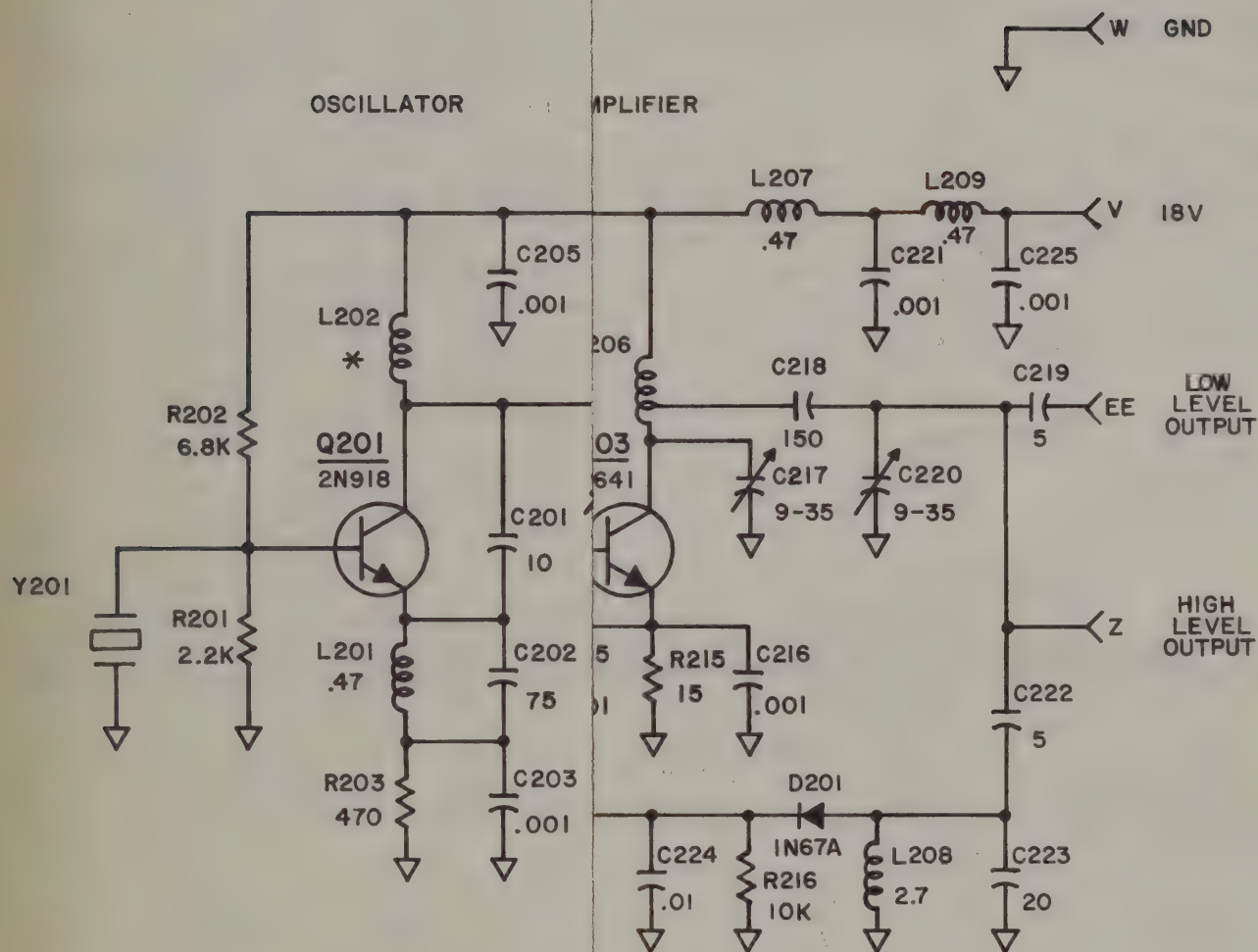


AEROCOM 2210 RECEIVER
 AUDIO MODULE AR-1048
 SCHEMATIC



AEROCOM 2210 RECEIVER
AUDIO MODULE AR-1048
SCHEMATIC

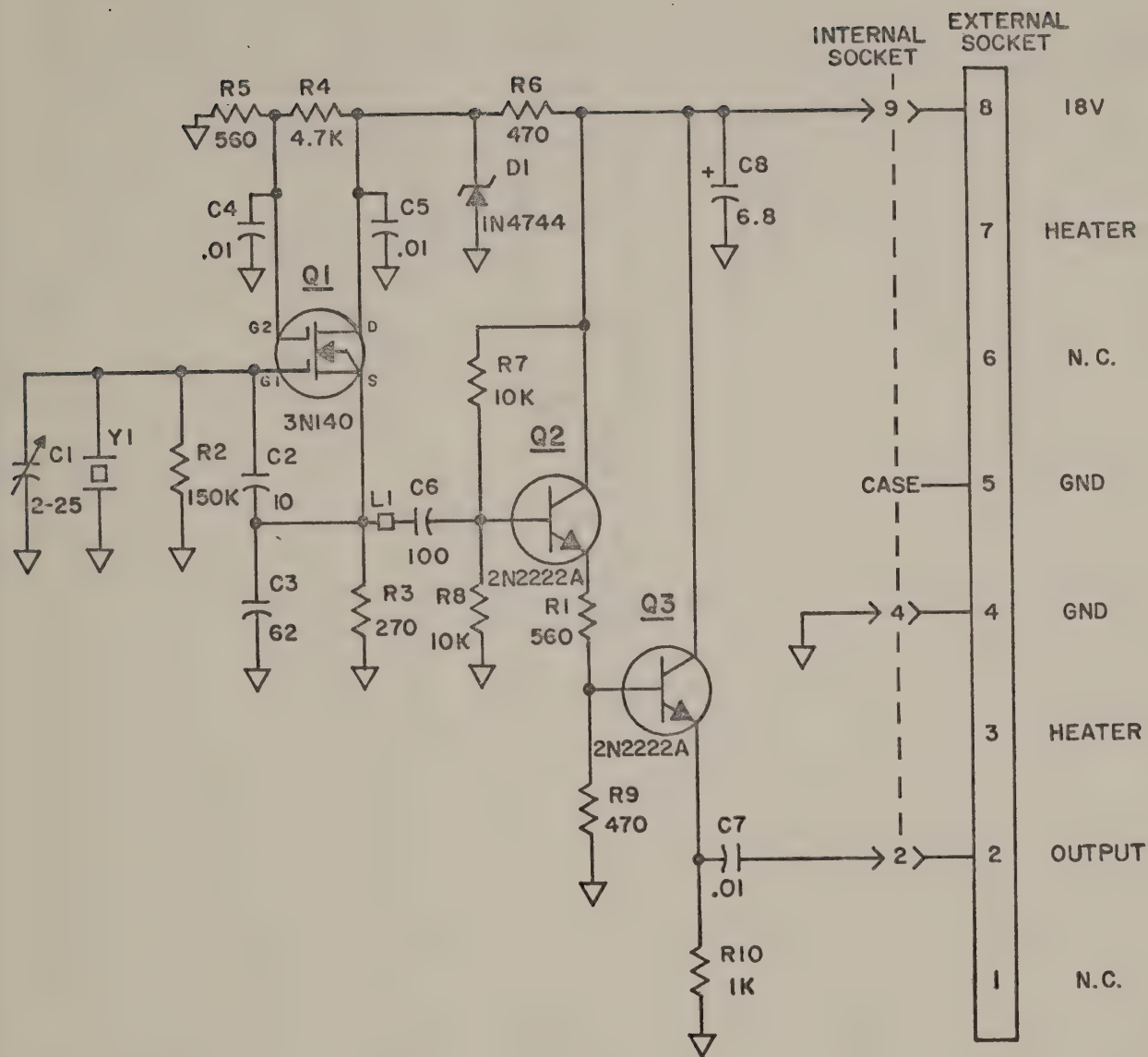




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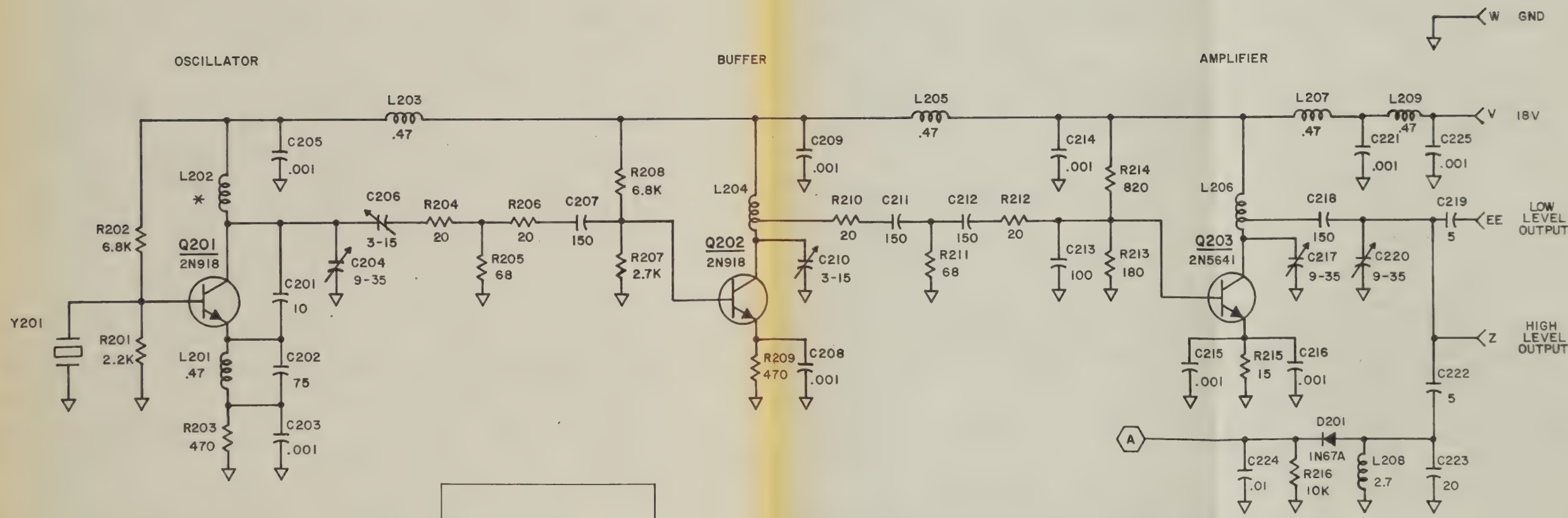
FREQUENCY	L202
66 TO 78 MHZ	0.15 μ H
78 TO 90MHZ	0.10 μ H

AEROCOM 2210 RECEIVER
VHF OSCILLATOR MODULE AR-1049A
SCHEMATIC



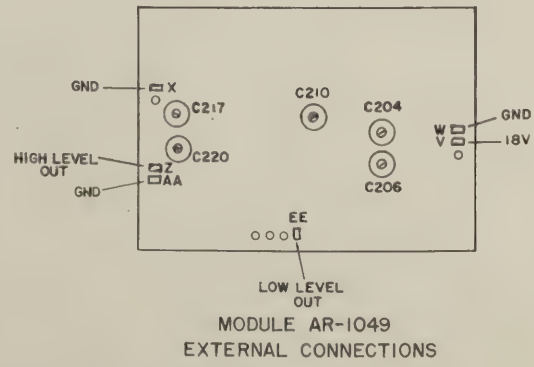
AEROCOM 2210 RECEIVER
HF OSCILLATOR
SCHEMATIC

-A CORRECTED FOR S/N 119 AND UP. 10MAR75

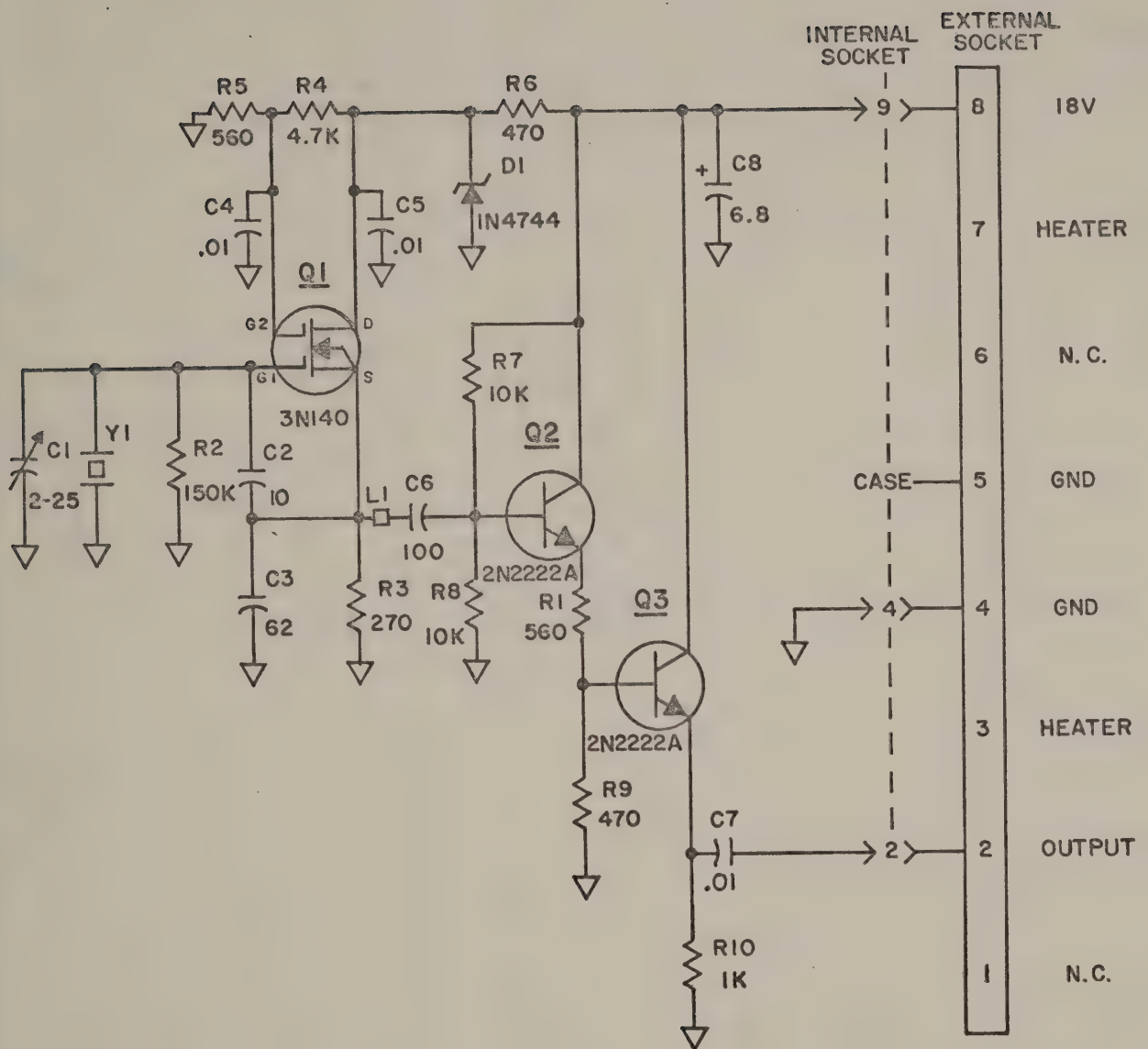


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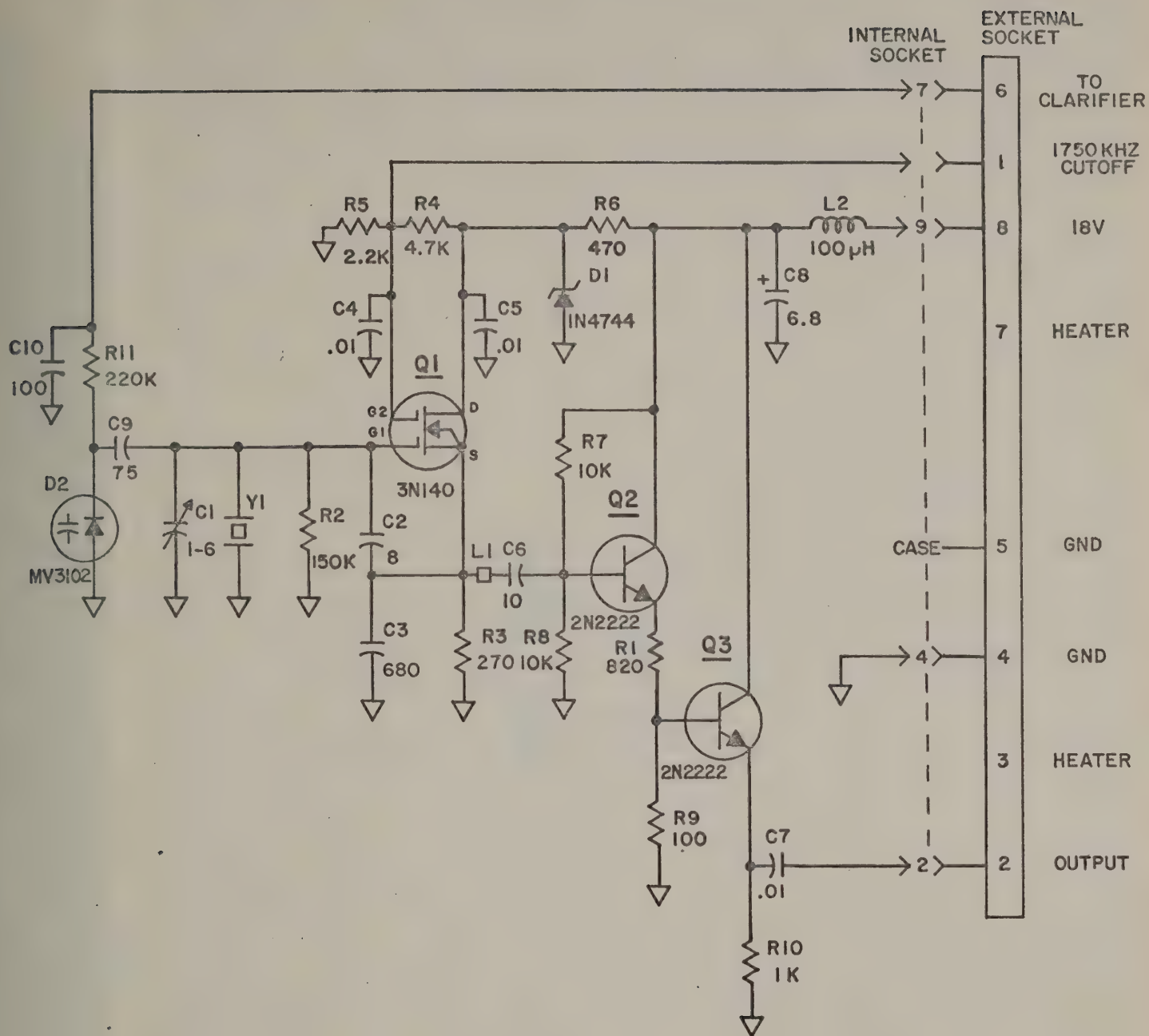
FREQUENCY	L202
66 TO 78 MHZ	0.15μH
78 TO 90MHZ	0.10μH



AEROCOM 2210 RECEIVER
VHF OSCILLATOR MODULE AR-1049A
SCHEMATIC

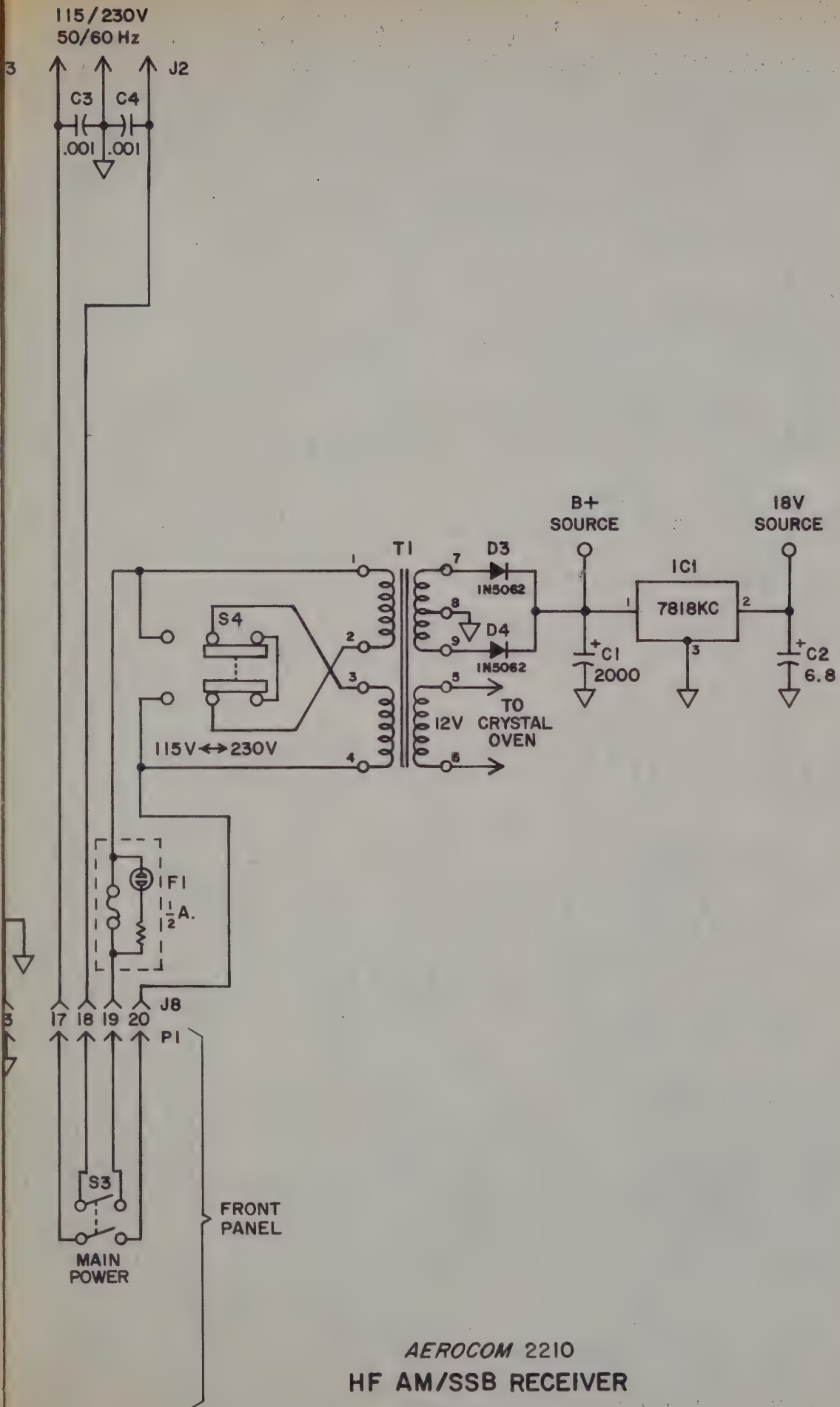


AEROCOM 2210 RECEIVER
HF OSCILLATOR
SCHEMATIC



AEROCOM 2210 RECEIVER
1750 KHZ OSCILLATOR
SCHEMATIC

-1 CORRECTED FOR S/N 119 AND UP. 12 MAR 75 LTM
 -2 ADDED R8 TO ALLOW MECH. CENTERING OF "CLARIFIER" AND CORRECTED K1 1 AUG 75 JP
 -3 CORRECTED D1, WAS SHOWN AS MV 5062 26 JAN. 76 DJK/JP



AEROCOM 2210
 HF AM/SSB RECEIVER
 SCHEMATIC

-1 CORRECTED FOR S/N 119 AND UP 12MAY75 LTM
-2 ADDED R8 TO ALLOW MECH. CENTERING OF "CLARIFIER" AND CORRECTED K1 1AUG75 JP
-3 CORRECTED D1, WAS SHOWN AS MV5062 26 JAN. 76 DUK/JP

